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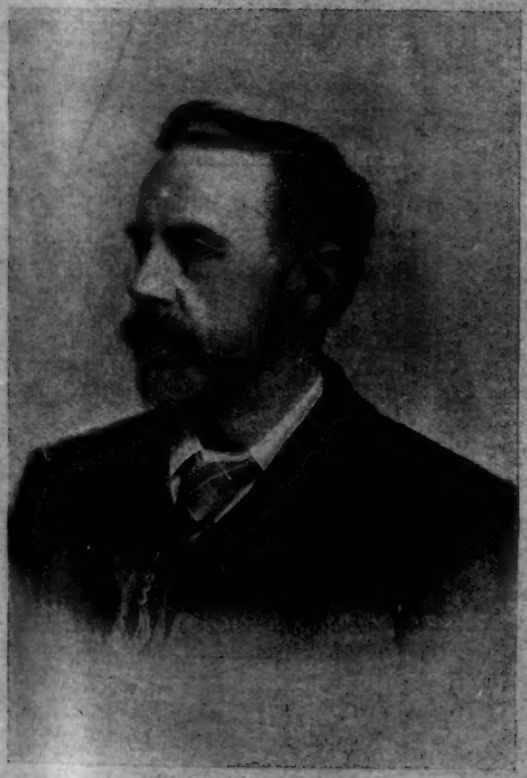

THE COMING PRESIDENT OF THE N.U.T.
(MR. C. J. ADDISCOTT.)

CONTENTS

OF THE

FEBRUARY NUMBER.

	PAGE
WELL-KNOWN TEACHERS AT WORK. No. LII.—Mr. C. J. ADDISCOTT	425
CLASS LESSONS IN DOMESTIC ECONOMY. By Ethel R. Lush	426
AS OTHERS SEE US	430
EDUCATION ABROAD	431
THE INSPECTOR'S NOTE-BOOK. By An Inspector of Schools	435
'A QUEER SHILLING.' A School Play for Boys. By Joseph Despicht	435
OUR SCOTCH LETTER	437
OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE. By Arthur T. Flux	438
PRIMARY EDUCATION IN BELGIUM. By Chas. J. Addiscott	444
CARDINAL VAUGHAN ON THE TRIANGULAR BATTLE FOR EDUCATION	446
QUERY COLUMN	447
OUR FRENCH PRIZE COMPETITION	448
FEBRUARY PRIZE COMPETITION	448
INDUSTRIAL DRAWING IN ELEMENTARY SCHOOLS	449
BRUSH DRAWING. By J. Vaughan	451
OUR CHRISTMAS PRIZE COMPETITION (Award)	453
COURSE 'B' IN ARITHMETIC. By B. Elderkin	454
COMING MEN. XX.—Mr. W. L. Dowding	458
NEW PROBLEMS IN ARITHMETIC	460
MUSICAL PLAY FOR SCHOOLS—'IN THE WEST COUNTREE.' By J. E. Parrott, M.A., LL.B.; Music by R. Dunstan, Mus. Doc. (Cantab.)	466
NOTES AND NOTIONS. By T. B. Ellery	473
'COMPOSITION THEMES AND MORAL TRAINING.' By B. Elderkin	474
OUR 1897 CERTIFICATE CLASS. By J. C. Hoborn, M.A.	475
SCIENCE NOTES	476
NOTES ON PHYSIOLOGY. By Walter Overend, M.A., M.D. (Oxon.), B.Sc. (Lond.)	479
MAGNETISM AND ELECTRICITY. By Edwin Edser, A.R.C.S.	480
NOTES ON PHYSIOGRAPHY	482
MATHEMATICS. By G. A. Baxandall	483
CHEMISTRY NOTES. By Thomas Cartwright, B.A., B.Sc. (Lond.)	484
NOTES ON THEORETICAL MECHANICS. By F. Castle, M.I.M.E.	485
REPLIES TO SCIENCE QUERIES	487
'THE PRACTICAL TEACHER'S LIBRARY.'—V.—APPLIED HISTORY	489
REVIEWS	490

VOL. XVII No. 8

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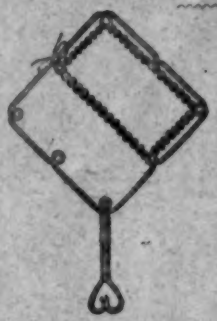

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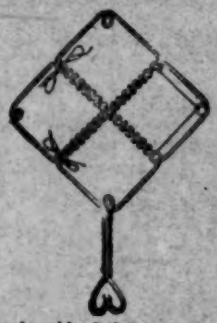

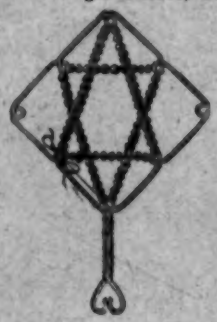

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'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

VOL. XVII. No. 8. FEBRUARY, 1897. { PRICE, 6D. / POST FREE, 8D.

☞ Owing to the issue of an Enlarged Number this month, we have found it necessary to reserve the SPECIALLY PRINTED COLOURED OBJECT LESSON SUPPLEMENT ON PLANT LIFE for publication in the March Number. Early orders should be given to Booksellers and Newsagents.

For some time past the issues have run out of print within fourteen days of publication, and although our printing order has been increased month by month, many teachers have been unable to obtain their copies of the Journal. TO PREVENT DISAPPOINTMENT, A STANDING ORDER SHOULD BE GIVEN TO BOOKSELLERS.

MANY BEAUTIFUL SUPPLEMENTS ARE IN PREPARATION FOR PUBLICATION IN THE NUMBERS TO BE ISSUED DURING 1897.

WELL-KNOWN TEACHERS AT WORK.

No. LII.—MR. C. J. ADDISCOTT,
At Daubeney Road Board School, Clapton Park.

VERY few, if any, Teachers of Elementary Schools are at present more widely known among their fellow-teachers than Mr. C. J. Addiscott. Elected last year to be Vice-President of the National Union of Teachers, he will shortly, in the ordinary course of things, be called upon to preside over a conference consisting of the representatives of the thirty-six thousand members of that important organisation. To a large majority of these members Mr. Addiscott is probably well-known by name and reputation, and to some thousands he is likely to be more or less personally known. Nearly six years of extremely active work on the Executive, and especially the responsible duties falling to him as Chairman of its Law Committee, have brought him into contact and correspondence with vast numbers of Teachers in connection with the many hundreds of legal cases he has had to investigate. His frequent visits to local associations and appearances on the platform to deliver addresses on professional topics, have also made his form, manner, and speech familiar far and wide to his fellow-workers in the cause of education.

It seems only reasonable to suppose that many who have this knowledge of Mr. Addiscott's work on behalf of his profession would readily welcome some account of his every-day life and work as a Teacher. It was, therefore, with much pleasure that we received his ready response of cheerful acquiescence in our proposal to visit his school with a view to include such an account in this series of papers.

On an appointed day accordingly we proceeded on our way to find Daubeney Road; but, as we had not thought it necessary to ask for a detailed route thither, we found ourselves in a sort of adventure little anticipated. When we arrived within the limits of the Hackney division and drew towards Clapton, we asked one likely person after another for the way to Daubeney Road, but all alike professed no knowledge of such a place, until at last a guardian of public order, who appeared to derive his knowledge from the fact of his having had children in the school, gave us definite directions which were easily followed. Arrived at the school, we entered the large hall of the boys' department, and received a cordial welcome from our friend Mr. Addiscott, who soon explained the little difficulty we had experienced. Though the school has been built and opened for ten years, one might almost parody the words of Charles Dickens's Mrs. Prig and say of Daubeney Road, 'There isn't no sich a road.' At present it is little more than projected, but when the project is fully carried out, it will be a good main road skirting the playground.

For the benefit of those readers who may be unacquainted with Mr. Addiscott's career, and for the sake of giving some completeness to this record, it may be well to preface the account of our personal interview with a summary of details supplied by our friend in answer to our inquiries, and supplemented from personal knowledge and other sources.

Mr. Charles James Addiscott, like the present occupant of the Presidential chair and his immediate predecessor, belongs to the class who are justly proud to proclaim themselves 'Men of Devon.' His career as a Teacher began with his Pupil Teachership in Holy Trinity Schools, Plymouth, whence he proceeded as a Queen's Scholar to Cheltenham, where he was trained during 1862–3. On leaving the Training College he was appointed Head Master of a rural Parochial School—St. Paul's—near Penzance. Later he became Head Master of St. Martin's Parochial School, Bradley, Bilston, where his work as a Lecturer and Teacher under the Science and Art Department was of a most successful and noteworthy kind. His Science and Art classes were held in the Bilston Town Hall, and his efforts in connection with two associations for young men are still remembered to his credit. It was while at Bilston that Mr. Addiscott became a member—and an active member—of the National Union. For three years he was Secretary of the South Staffordshire Association, and entered eagerly into the agitation against retrograde measures of the Department, arranging interviews with all the local M.P.s, and reading papers on educational policy at many

meetings. At the early Conferences at Manchester, York, and Bristol, he also took a prominent part.

In 1875 Mr. Addiscott entered the service of the London School Board as Head Master of Chatham Gardens School, afterwards removing to Canal Road School, and again, in 1886, to his present school, Daubeney Road. In the early days of the Centre System of training Pupil Teachers, when the instruction was given by the Day School Teachers out of the ordinary school hours, he was Head Master of the Hackney P.T. Centre, and gave instruction in French and Science to the seniors and to Scholarship Candidates.

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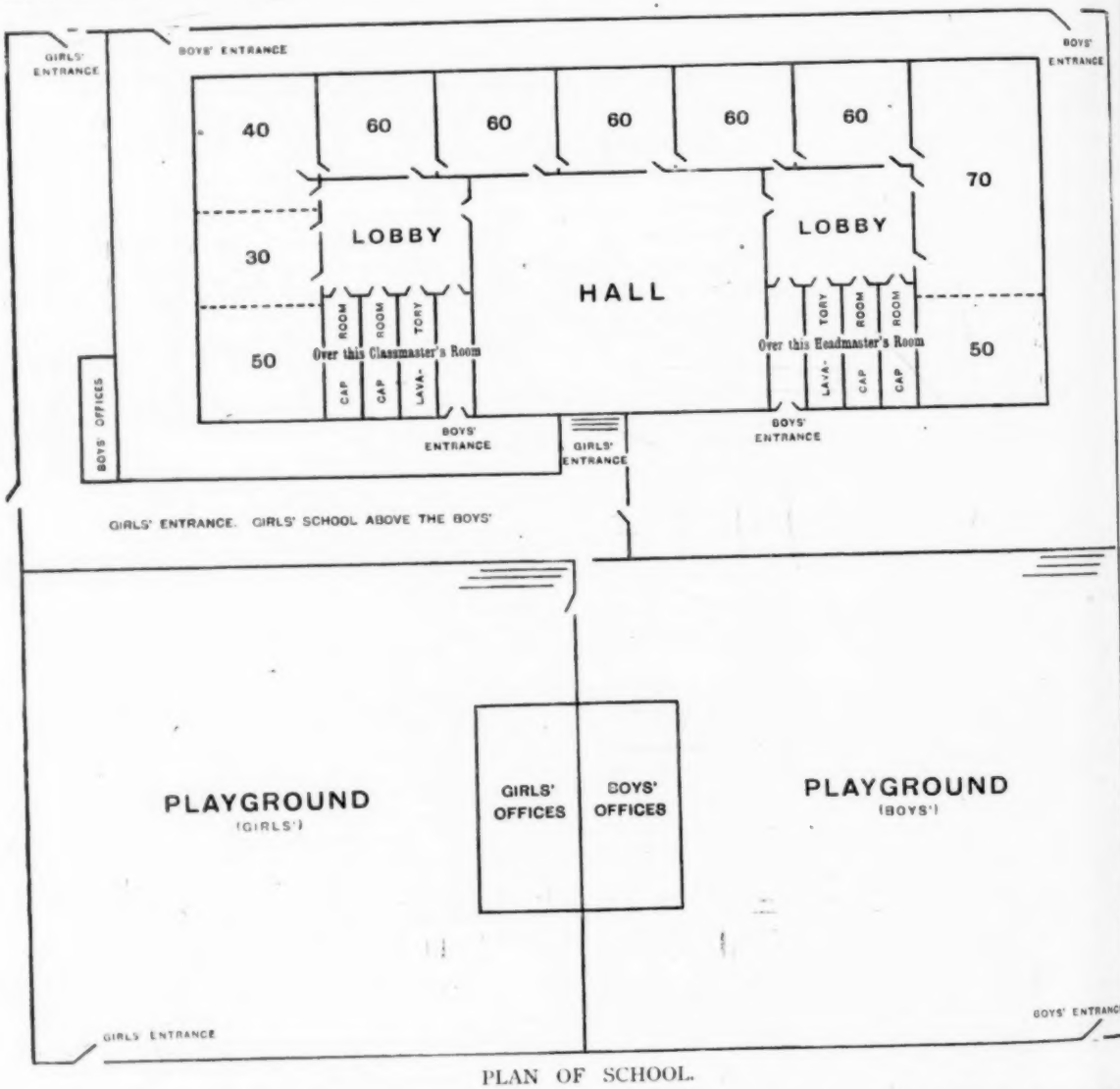

PLAN OF SCHOOL.

Since coming to Hackney, Mr. Addiscott has done an immense amount of local association work, having been Vice-President, President, and, for six years, Treasurer of this large association. He was Vice-Chairman of the London Conference Committee in 1890, and at the same time Treasurer to the Benevolent Purposes Committee. To complete this summary of National Union work, it may be added that he has been on the Executive since Easter 1891, that he has been nearly five years Chairman of the Law Committee, that he has represented the Executive on the Pupil Teachers' University Scholarship Council, on the Scholarship Committee of the incorporated Association of Head Masters. He

let us come back to Daubeney Road School, of which Mr. Addiscott has been for the last ten years Head Master. One can hardly apply to the school the description, 'beautiful for situation,' though its position certainly has some advantages. The building stands near the western border of the level stretch of land known as Hackney Marshes, and the street front looks over this district and the River Lea eastwards, towards Leyton and the nearer heights of Essex.

Of the school premises Mr. Addiscott says, 'he would not change them for any other under the London School Board.' Certainly a walk through the rooms and a careful examination of the plans convince us that the arrangements, so far as the

BRITISH MUSEUM

boys' department is concerned, could scarcely be improved. This matter has seemed to us so noteworthy that, at our request, Mr. Addiscott has kindly drawn for us a sketch-plan, which we have had reproduced to illustrate our description.

First it should be noted that the boys' department occupies the whole of the ground floor of the principal building. A large hall, in which the whole of the scholars can be assembled, forms the central portion of the west side. On the east side is a range of five class-rooms almost square, and each accommodating sixty boys. At each end additional accommodation is provided for 120 more boys in rooms varied in size, and so suited for classes larger or smaller than the average. Thus the total accommodation is for 540 boys, without reckoning the central hall. Separate cap-rooms, lavatories, and exits are provided at each end of the hall, and this greatly facilitates the assembly and dismissal. Mr. Addiscott stated that he found it possible to dismiss the whole school of some 550 scholars in an orderly way in about 2½ minutes. Towards the close of our interview, after the boys had sung the 'grace before meat,' we had an opportunity of observing with what ease the dismissal is managed.

The first floor is occupied by a series of rooms for the girls arranged on a similar plan to the boys' department, and over the central hall is an Art Room fitted up with sixty single seats and well adapted for the teaching of drawing. On the west side of the school building are large and convenient separate playgrounds for boys and girls.

The infant department is accommodated in a distinct building, situated in the midst of a piece of ground to the north of the portion already described, from which it is separated by a dividing wall. The whole premises may be most fittingly characterised as excellent for their purpose; but as our friend the Head Master explains, owing to the great length of the structure compared with its height and also to its position, an effective general view cannot well be obtained for reproduction as we had wished.

MR. C. J. ADDISCOTT.

Questioned about the class of children attending the school, Mr. Addiscott said: 'Most of them come from a poor class migratory in character. As evidence of this may be mentioned the fact that a Children's Dinner Fund, managed by a local religious body, supplies to the scholars 800 free breakfasts and 600 free dinners per week during the winter season—and all these are supplied in cases known to the Teachers to be deserving. Our work here,' added Mr. Addiscott, 'is for the most part of a missionary character. The parents of many of the children are engaged in work carried on near the banks of the Lea, much of it casual work, something like that of dock-labourers. This accounts for the frequent migration of families.'

'How does this affect the attendance?'

'Well, naturally it is detrimental to good attendance. The number on our books is 583, and the number now present is 451. This is, perhaps, a little below the usual proportion of attendance; but the system employed to enforce attendance is practically a failure.'

In the course of further conversation on the conditions of the school, Mr. Addiscott described the operation of a Scholars' Boot Club, which seems to be very successful. 'It is not altogether a charity, though partly so. A large number of the boys belong to it. They pay one penny per week, and a bonus is added out of money subscribed by charitable friends. This bonus amounted last year to about 3½d. added to each shilling subscribed by the boys. The plan is much better than giving the boots without payment. I would not adopt the latter course; it would empty the school.'

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The need of civilising agencies in such a neighbourhood is fully recognised, and the work of the school in this direction is kept well in view. With this object much attention is paid to physical education. We had noticed that the classes were engaged at drill and physical exercises in the playground on our arrival at the school, and a glance at the time-table, upon which we found our friend engaged at the same time, shows what a prominent place is given to this important branch of instruction. We are further informed that a cricket club is kept up in connection with the school, and some three years ago this club succeeded in gaining the Schools' Challenge Cup. By means of an Old Boys' Club—the Argyle—the interest of former scholars in their school and in one another is kept alive.

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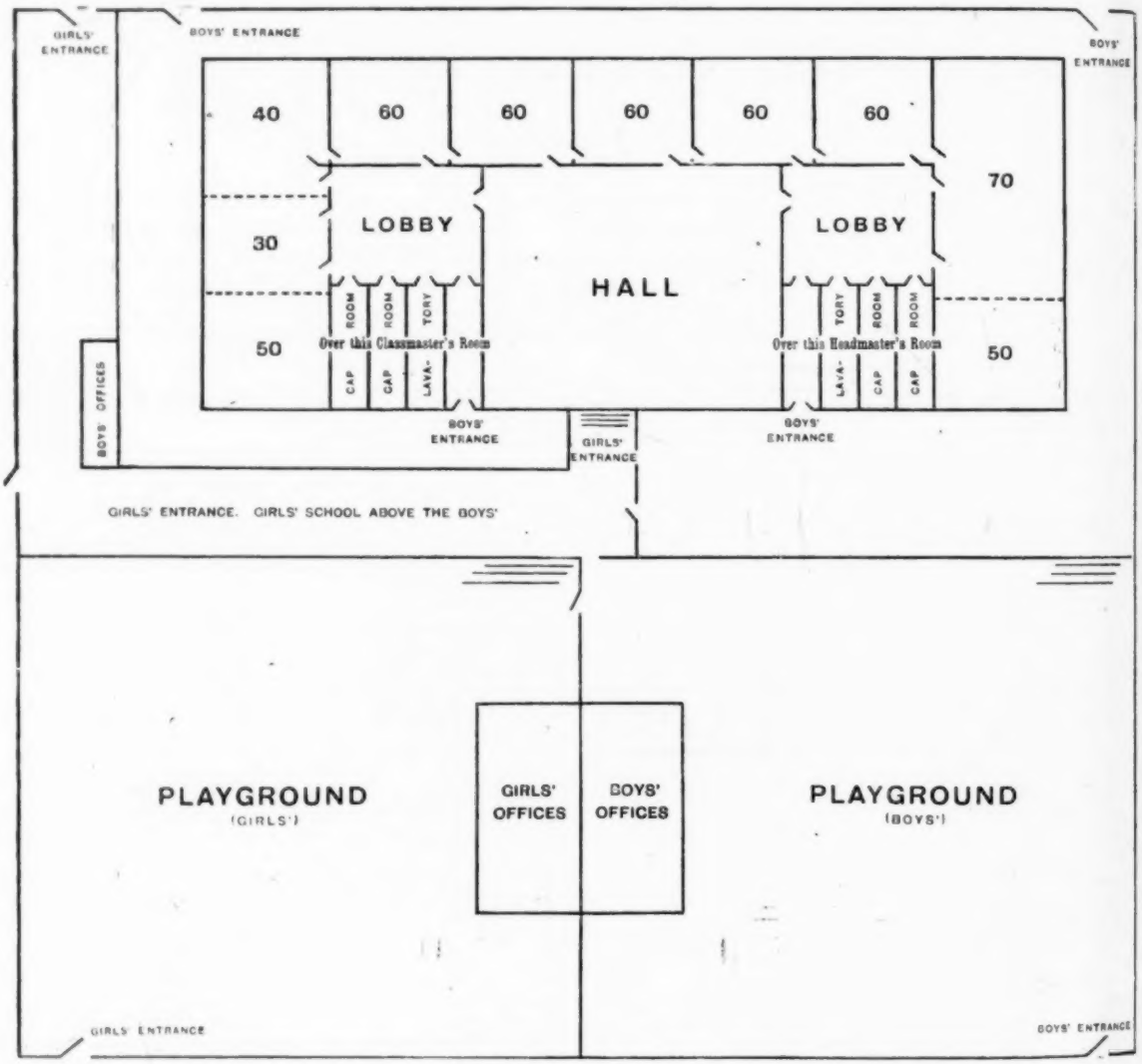

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elementary science have long formed a regular part of the work of each class.

On four half-days each week forty scholars, that is 160 in all, attend a Manual Training Centre for instruction in woodwork. The chief drawback to this is the consequent difficulty in arranging for the continuous work of all the scholars in other subjects.

In the course of our visits to the different class-rooms, we find abundant evidence of the excellent spirit in which the work of teaching and supervising is carried on by Mr. Addiscott and his staff of nine certificated class masters. We see specimens of the drawing done in some of the standards, listen to reading and other lessons, and hear the upper standards conducted by Mr. Clubb sing some good choral music in parts. We also find confirmation of the Head Master's remarks on the class of children chiefly attending the school. But since the details of the actual work in a well-appointed elementary school must be of the nature of an oft-told tale, we refrain from dwelling on them.

Something more may, however, very properly be said of Mr. Addiscott's striking personal qualities. He possesses undoubtedly a well-cultivated intellect, keen and active, with the somewhat highly strung nervous system which is characteristic of the literary and artistic temperament. At the dinner given last year to celebrate his election as Vice-President of the National Union, his colleagues, Mr. Macnamara and Mr. Yoxall, described in well-chosen terms his splendid qualities. The former remarked on his deep scholarship and breadth of culture, and on the energy, the circumspection, and the discretion he displayed in his difficult and delicate work as Chairman of the Law Committee. The latter spoke of him as 'Artist, man of letters, cultured gentleman, wise, cautious worker, and withal a man whose modesty had necessitated his being absolutely dragged to the front.'

With reason to know that these words are by no means misapplied, and with the knowledge fresh in one's mind of the kind of practical educational work involved in conducting a Board School of the poorer type, one may be tempted to wonder whether such a position affords the best possible field for the employment of talents like Mr. Addiscott's. The influence, however, of such a mind on such a field of labour must undoubtedly be a beneficial one, particularly in a case where the worker regards himself as an educational pioneer, a missionary of civilisation. At times, probably, the presence of unfavourable conditions as hindrances to the effectiveness of his work may set up a reaction, and have a depressing influence on the worker. But here, as it seems to us, comes in one of the best lessons to be learnt from Mr. Addiscott's career. His mental culture, his stores of knowledge, his artistic and literary tastes, constitute a wealth of resources which enable him to employ his leisure hours in congenial pursuits, which are indeed the most effective form of rest and recreation.

We have spoken of Mr. Addiscott as an artist. This does not mean merely that he has gained drawing certificates and taught elementary art classes. He has been an art student at South Kensington, and is a registered life student at the National Gallery and the British Museum; he has taught advanced classes in painting and sketching. Engaged day by day in somewhat prosaic work on the rather unlovely level district near the lower banks of the Lea, he has journeyed on fine Saturdays to its higher reaches near St. Margaret's and Broxbourne, and there sought out pretty scenes and transferred them to his canvases. Some of his pictures have been hung at important public exhibitions.

Mr. Addiscott is a good French scholar, having a long and intimate acquaintance with the language and literature of France, and also a knowledge of German. This knowledge he has turned to good account by spending many of his holidays on the Continent, visiting the schools and studying on the spot the educational systems of North Italy, Switzerland, Belgium, Holland, West Germany, and Norway. We have ourselves met with him making his way across the Channel to visit Switzerland and the Italian lakes. His knowledge of French has enabled him to render effective services when representing the English Teachers' Union at foreign congresses, where he has addressed the teachers present in a language they could all understand.

As our readers may welcome a sample of Mr. Addiscott's discourse in French we venture to make an extract from the address he delivered at the congress at Liège last September, as reported in the *Journal des Instituteurs Belges*. We do this with the less hesitation as the matter dealt with is of such importance to English teachers:—

> 'En Angleterre, nous croyons être à l'avant-garde du progrés en fait d'éducation, mais je crains que ce ne soit une illusion. Vous avez, mes chers confrères, l'heureux avantage d'être assurés d'une pension de retraite. J'espère que, de même que nous vous avons suivis, au sujet de l'instruction gratuite, de même aussi, nous parviendrons à obtenir cette pension tant désirée. Nous esperons que notre pays reconnaitra enfin son devoir et qu'il assurera aux hommes et aux dames, une sécurité bien meritée pour leurs vieux jours. Je lisais, il y a quinze jours dans votre organe, un article intitulé "Pourquoi le cinquantième?" L'auteur disait, avec raison: "La logique et le bon sens veulent que les instituteurs soient mis, tout au moins, sur un même pied que les employés des douanes," etc. En Angleterre, nous sommes encore reduits à nous adresser au Ministre, chapeau bas, et à lui dire: Donnez une pension, si pas comme nous la voulons, au moins comme vous le pouvez. Esperons que la logique fera dire bientôt aussi, que les instituteurs anglais doivent être mis au moins, sur le même pied que leur confrères belges. Je dois ajouter qu'en Angleterre, comme en Belgique, nous n'aurons de repos que quand nous aurons obtenus pour nous-mêmes, l'independance et le prestige nécessaires pour pouvoir donner une éducation vraiment rationelle, nationale et patriotique.'

So we have come back to our friend's work for the good of his profession. We have dwelt on his intellectual equipment and some of his favourite recreations, not only because of the encouragement and the good example they may furnish, but because they may help us the better to understand the words he used at the dinner we have already referred to, when he said his work for the Union 'had involved many serious sacrifices—the giving up of many dearly-loved pursuits.' Their due consideration may also help us to a fuller recognition of the debt we owe to one who denies himself so much for the sake of his fellows. When one hears such a man lament that his many engagements prevent him from keeping up with his general reading, one can only trust that in the consciousness of useful work done for others and of reasonable appreciation of such service he may find at least some compensation for his sacrifices.

With something of an apology for asking—in view of the near approach of the occasion on which Mr. Addiscott may be expected to lay his opinions on education before the country—we did venture to ask if he would mind making some statement of his opinions on prominent educational topics. He did not appear to think the apology necessary, and readily responded. 'A few of the points of policy or opinion upon which I feel strongly are these: First, the improvement of our primary schools by effectively worked bye-laws, so as to secure a longer school-life for the child. No experimentalising upon children by either raw recruits of pupil-teachers or unqualified adults. Next, a simplification of the system of State aid, providing that, so far as primary schools are concerned, the work of the Science and Art Department should be taken over by the Education Department. Then I desire the improvement of the teacher's position by better tenure, and I am of opinion that a scheme of superannuation will improve it. Tenure in rural schools would also be materially improved by the abolition of Article 68 of the Code. Federation may, in town districts, tend to keep voluntary schools on their legs; but it will be at the cost of teachers for whom there is no ray of hope in federation. The salvation of the profession *does not lie* in the application to it of the generally received principles and practices of Trades Unions.

'The spread of agencies for Secondary Education, Higher Grade Schools, Technical Schools, the educational work of County Councils, and the coming new departure, are so many calls to the primary teacher to level up or he will be "left." His place will be taken by the unemployed output of our public schools and universities.'

We feel grateful to Mr. Addiscott for this brief but pregnant statement of opinion, which seems to us worthy of earnest consideration by all teachers. Such weighty matter may

DAUBENEY ROAD SCHOOL—BOYS' DEPARTMENT.

TIME TABLE FOR SCHOOL YEAR ENDING MAY, 1896-7.

MORNING.

Days.	Class No.	I	9—9.5.	9.10—9.40.	9.5—9.10. 9.40—9.45.	9.45—10.30.	9.30—10.40.	10.40—10.45.	10.45—11.20.	11.25—55.	9—12.	11.55—12.	2—2.5. 2.15—2.20.	2.5—2.50.	2.50—3.15.	2—4.30.	3.15—3.25.	3.25—3.30.	3.30—3.55	3.55—4.25.	4.25—4.30.
MONDAY.	1 } 2	vii.	Assembly and Prayers.	Religious Instruction.	Marking and Closing Registers.	Drawing	Recreation.	Physical Exercises.	Drawing	Drawing	Woodwork. 40 Boys.	Singing and Dismissal.	Marking and Closing Registers.	Elem. Science	Mental Arith.	Woodwork. 40 Boys.	Recreation.	Physical Exercises.	Singing	Geography	Prayers and Dismissal.
	2	vi.				Drawing			Drawing	Drawing				Elem. Science	Mental Arith.				Singing	Geography	
	3	v.				Arith.(Mt.or Wr.)			Reading	Writing				Geography	Mental Arith.				Geography	Draw. or Sing.	
	4	iv.				Arith.(Mt.or Wr.)			Reading	Writing				Drawing	Mental Arith.				Geography	Singing	
	5	iii.				Arith.(Mt.or Wr.)			English	Spelling				Drawing	Drawing				Writing	Reading	
	6	ii.				Arith.(Mt.or Wr.)			Reading	Writing				Reading	Drawing				English	Dictation	
	7	i.				Arith.(Mt.or Wr.)			Reading	Writing				Drawing	Reading				Science	Spelling	
TUESDAY.	1 } 2	vii.				Arith.(Mt.or Wr.)			Reading	Writ. or Dict.	Woodwork. 40 Boys.			Drawing	Composition				Drill to 3.45	Sing. from 3.45	
	2	vi.				Arith.(Mt.or Wr.)			Reading	Writ. or Dict.				Elem. Science	Composition				Drill to 3.45	Sing. from 3.45	
	3	v.				Arith.(Mt.or Wr.)			Reading	Composition				Elem. Science	Singing				Drill to 3.45	English	
	4	iv.				Arith.(Mt.or Wr.)			Reading	Geography				Elem. Science	Dict. Spelling				Singing	English	
	5	iii.				Arith.(Mt.or Wr.)			Reading	Geography				Elem. Science	English				Mental Arith.	Read. or Spell.	
	6	ii.				Arith.(Mt.or Wr.)			Reading	Spelling				Dictation	Singing				Geography	Dictation	
	7	i.				Arith.(Mt.or Wr.)			Reading	Writing				Geography	Mental Arith.				English	Dictation	
WEDNESDAY.	1 } 2	vii.				Arith.(Mt.or Wr.)			Reading	Writing				Geography	Mental Arith.				English	Elem. Science	
	2	vi.				Arith.(Mt.or Wr.)			Reading	Writing				Geography	Mental Arith.				English	Elem. Science	
	3	v.				Arith.(Mt.or Wr.)			Reading	Elem. Science				Geography	English				Drawing	Drawing	
	4	iv.				Arith.(Mt.or Wr.)			Elem. Science	Writ. or Spell.				Geography	English				Drawing	Dict. Word Bldg.	
	5	iii.				Arith.(Mt.or Wr.)			Reading	E'em. Science				Drawing	Drawing				Arithmetic	Singing	
	6	ii.				Arith.(Mt.or Wr.)			Reading	Writ.or Word Bd.				Elem. Science	English				Drawing	Drawing	
	7	i.				Arith.(Mt.or Wr.)			Reading	Writ.or Word Bd.				Elem. Science	Arithmetic				Drawing	Drawing	
THURSDAY.	1 } 2	vii.				Arith.(Mt.or Wr.)			Reading	Writ. or Dict.	Woodwork. 40 Boys.			Elem. Science	Mental Arith.				English	Composition	
	2	vi.				Arith.(Mt.or Wr.)			Reading	Writ. or Dict.				Elem. Science	Mental Arith.				English	Composition	
	3	v.				Arith.(Mt.or Wr.)			Reading	Comp. or Dict.				Drawing	English				Writing	Geography	
	4	iv.				Arith.(Mt.or Wr.)			Reading	Writing				Drawing	Drawing				Drill to 3.45	Elem. Science	
	5	iii.				Arith.(Mt.or Wr.)			Reading	Writing				Reading	Geography				Drill to 3.45	Dict. Word Bldg.	
	6	ii.				Arith.(Mt.or Wr.)			Reading	Elem. Science				Writing	Mental Arith.				Drill to 3.45	Singing	
	7	i.				Arith.(Mt.or Wr.)			Reading	Var. occupation				Writing	Writing				Spelling	English	
FRIDAY.	1 } 2	vii.				Arithmetic			Reading	Writing				Drawing	Elem. Science				Drill to 3.45	Geography	
	2	vi.				Arithmetic			Reading	Writing				Drawing	Elem. Science				Drill to 3.45	Geography	
	3	v.				Arithmetic			Reading	Writing				Drawing	Elem. Science				Spelling	Singing	
	4	iv.				Arithmetic			Reading	Writ. or Spell.				Drawing	Drawing				Elem. Science	Singing	
	5	iii.				Arithmetic			Elem. Science	Writ. or Spell.				Drawing	Geography				Reading	Singing	
	6	ii.				Arithmetic			Reading	Writing				Drawing	Drawing				Spelling	Elem. Science	
	7	i.				Arithmetic			Reading	Writing				Reading	Elem. Science				Drill to 3.45	Singing	

AFTERNOON.

form a fitting conclusion to this record, and with heartiest wishes for a successful year of office, and a long and useful professional career, we take leave for the present of the coming President of the N.U.T.

CLASS LESSONS IN DOMESTIC ECONOMY.

BY ETHEL R. LUSH.

Author of 'Chats with Children on Domestic Economy,' Head Mistress of the Ipswich Higher Grade Girls' School, and Organising Mistress to the Ipswich School Board.

Lesson VII.

STANDARD IV.

USES OF FOOD.

[*Apparatus required.*—Diagrams showing the various tissues of the body ; a hen's egg.]

If you were asked what part of the daily routine you could not dispense with, you would answer, the taking of food.

Have you ever considered why a proper supply of good food is so necessary ? You at once say we could not live without food. But why is food necessary to sustain life? Let us see.

You have observed a steam engine at work either on the railroad or in a factory. As you watch the wheels move round, and the steam and smoke come puffing out, you could almost fancy it to be a living thing, and indeed in many respects it closely resembles the human body. It is fed with fuel as we are fed with food. Air is necessary to the steam engine as it is to us in order that the fuel in the one case, and food in the other, may be consumed. The result of the burning going on inside the engine is seen in the immense force produced, and the result of the burning of food and air which takes place in our bodies is seen in the strength we possess.

From this comparison we learn that one of the uses of food is to give *strength or force*, and when you remember how very weak a person becomes who is unable to take sufficient food you will readily realise the truth of this statement.

A steam engine lasts for a great number of years, but eventually it wears out, and is put on one side to be sold for old iron. In the same way our bodies wear out day by day, and it seems surprising that we do not gradually get thinner and thinner as a result of this constant waste. But in actual experience we find that a healthy adult varies little in weight for many years, and this fact goes to prove that the daily waste must be regularly made good in some way.

Every part of our body, whether it be muscle, bone, brain, or nerve, is constantly wasting away, and as constantly being renewed. This work of building up is done by the blood, which carries bone-making material to the bones, nerve-making material to the nerves, and so on to all the tissues, never making mistakes and never neglecting its duty. As fast as the blood parts with this renewing material it gains a fresh supply from the food we eat. This work of waste and renewal may perhaps be made more clear in this way : Imagine two fires equally large and bright. One is mended from time to time, the other is neglected, and, as a consequence, the first keeps up its original size and brightness, but the second one wastes away and dies. Both fires have burned away the coal that originally composed them, but in the first case the waste was made good as fast as it occurred, whereas in the second no renewal was made. Our bodies are replenished much in the same way as the first fire mentioned, food taking the place of coal. You will see from this that in the course of time, although our personality is the same, our bodies must be completely changed, nothing of the original one being left. We may summarise this by saying that a second use of food is *to repair the daily waste of the body.*

Notwithstanding the daily wear and tear to which your body is subjected, it actually grows bigger. From the time when a baby is born until it is quite grown up its body is increasing in size, and frequently when an adult ceases to grow in length he increases in width.

Look for a moment at this hen's egg. Inside, as you know, is a yellow ball called the yolk, which is surrounded by a sticky transparent fluid called the white. I will break it into a saucer so that you may see on the yolk a little speck which, if the egg had been hatched, would in time have become a chicken. The white and the yolk are simply a store of food upon which the little spot, or germ as it is called, feeds, growing day by day as the store of food diminishes, until at last the chicken is formed, breaks its shell by tapping with its tiny beak, and steps out into the world.

Nor does its growth stop here, for, as you know, the chicken runs about and eats the whole day long, and the food it takes builds up its tissues until at last the chicken reaches its full size. You will have gathered from this that it is owing to milk and other foods which children take that they, too, grow, so that we may state as a third use of food, *to build up the growing tissues.*

In the first part of the lesson you heard that force is produced by the union or burning together of food and air. Now you are told that whenever this union takes place *heat is produced.*

If you drop a piece of bread into the fire it quickly turns black, bursts into flame, and burns merrily, and if you try to snatch it from the fire you burn your fingers. Fats, oils, and sugars will burn even more readily than will bread, so that it is easy to believe that foods will burn and produce heat. But you may say there is no fire in the body. Let us see. Here is a lighted candle burning steadily, but the moment I put an extinguisher over it, out it goes, because I have cut off the supply of air, without which the tallow of the candle cannot burn.

You have seen that foods will burn. You also know that we take air into the body by means of the lungs. The air breathed in unites with the food, and a slow burning takes place, to which we give the name of *oxidation*, heat being thus produced.

To understand thoroughly the work of the food in building up and renewing the body you must know a little of the structure of the tissues which compose it.

First we must consider the framework or *skeleton*, which is made up of no less than 200 separate bones. It is the shape of the bones which determines the shape of the body ; thus the bones of the head are found to be fitted together so as to give a smooth rounded form ; the bones of the arms and legs are long and thin ; the ribs are arranged in a cylindrical form, and so on.

Most of the bones are jointed so that they can move one upon another ; thus the lower part of the arm moves upon the upper ; others are fixed, as, for example, the upper jaw-bone, and the bones which make up the skull.

These movable bones, however, cannot move of their own accord. Force must be exerted, and this is provided by an ingenious arrangement of tissue which we call *muscles.*

When a rabbit is skinned you see exposed to view a mass of pink flesh, arranged in bundles which seem to intertwine and overlap each other ; these are the muscles which cover the bones, and in the human body the muscles are arranged in the same way.

Muscles are the means by which the bones are moved, and where we find large bones we find also large strong muscles. If you close your fist and bend your forearm upon the upper arm you will feel a hard lump rising in the upper arm. This is the biceps muscle, which, by contracting and thus becoming shorter, pulls the lower arm up. You can feel also hard muscles in the legs, and, indeed, in almost all parts of the body.

But the muscles cannot move of their own accord. They must first receive an impulse from another set of tissues called *nerves.*

If you were to dissect a rabbit you would find numerous thin, white, silky-looking strings which extend in every direction and spread themselves among the muscles. On tracing one of these nerves, as they are called, to its source we should discover that it is one of many branches from the long white cord which lies inside the backbone, called the spinal cord, and on following the upward course of the spinal cord we should

reach the brain, which is lodged in the skull. It is plain, therefore, that there is connection between the brain and every one of these silky nerves. Thus when, for example, you wish to move your arm, an impulse is conveyed from the brain to the nerves which govern the muscles; the muscles then contract, pull upon the bones, and movement occurs.

The blood which conveys nourishment to all these tissues flows through an elaborate system of blood-vessels, some of which are very large, others as fine as hairs; and so numerous are these tiny vessels that you cannot prick yourself in any part of the body without piercing one. The heart, which you may feel beating on the left side of your chest, acts as a pumping machine, and forces the blood through the blood-vessels.

SUMMARY.

Uses of Food:—

1. To give force.
2. To repair the daily waste of the body.
3. To build up the growing tissues.
4. To give heat.

Kinds of Tissue:—

1. Bony tissue, composing the bones.
2. Muscular tissue, composing the muscles.
3. Nervous tissue, composing the brain, spinal cord, and nerves.
4. Fatty tissue.

The Circulatory System consists of the heart and blood-vessels. The blood conveys nutriment to the tissues.

AS OTHERS SEE US.

LOVABLE Robbie Burns never voiced a more general human yearning than that which has such apt expression in his well-known couplet—

> 'O wad some pow'r the giftie gie us
> To see oursels as ithers see us.'

Not infrequently the realised yearning brings but little satisfaction, for it is in strict accordance with the canons of proverbial law that 'listeners' should 'hear no good of themselves.' On the other hand, it occasionally happens that the onlooker, who, as is on all sides admitted, sees the best of the game, discovers good points in the observed ones, of which they were becomingly ignorant. When such a 'chiel's amang us takin' notes,' it is very comfortable to read them after the inevitable 'prenting' has taken place. This is the case now under consideration. Way back in what should have been sunny September, but which was unpatriotically and persistently a watery season, came to the shores of perfidious Albion a goodly company of seventeen ladies, comprising, in the words of the charming *raconteuse*, as given in the *Revue Pédagogique, Paris*, 'une directrice d'école normale, une directrice d'école communale, plusieurs dames professeurs de lycées, trois dames des maisons d'éducation de la Légion d'honneur, des dames professeurs des écoles normales et des écoles primaires supérieures, une maîtresse adjointe.'

They came upon the invitation of the Franco-English Guild, who, 'moyennant une somme modeste,' had arranged 'un séjour de trois semaines.' During those three weeks our visitors were under the tutelage of Miss Williams, their location being the 'Art Students' Home' in Brunswick Square, from which coign of vantage they issued forth on various expeditions, during which 'Londres et les Londoniens' were to be studied in general, and, as behoved sisters of the gentle art and craft, the education question in particular.

> 'La première chose à voir quand on est à Londres, c'est évidemment la ville elle-même.'

This was done by the aid of Miss Williams, 'et une jeune Londonienne,' not, be it remarked, without fear and trembling, so that it is worthy of thankful remark that,

> 'Grâce à nos deux vigilantes gardiennes, nous avons parcouru sans accident l'immense ville et nous en sommes revenues au complet.'

Although we of the Dismal City may read with intense interest the reflections of Mdlle. Blanc upon our monster excrescence which we love so passionately, readers of the 'PRACTICAL TEACHER' will prefer that we should merely put on record the short pithy summary in which our most welcome visitor epitomises her sentiments, which were naturally greatly influenced by the prevalent rains:—

> 'C'est par le mauvais temps que nous l'avons vu: une pluie presque continuelle, une boue épaisse, une fumée de charbon de terre qui donne aux maisons une teinte noirâtre ne nous permittent pas d'en parler comme d'une ville jolie et agréable; mais c'est sûrement une ville très intéressante que l'on ne peut voir sans émotion.'

This is letting us down right handsomely, when it is remembered that the French man in the street only permits an English summer to have three fine days and a thunderstorm. If London, which we perverse Cockneys firmly regard as the true hub and centre of the universe, fails to charm whilst interesting intensely, Mdlle. Blanc gives us our revenge when speaking of its environs, which, 'avec ses collines boisées, ses vertes prairies et ses haies toffues, charme d'autant plus qu'elle contraste davantage avec la ville elle-même.'

The seventeen visited Oxford and Cambridge, and were duly impressed with the lawns and the quadrangles, the river and the fine old buildings. The following may be pleasant reading for the lecturer, but the bashful collegian whose only response to the Gallic invasion was a precipitate retreat, unaccompanied by scrip or scrippage, much less bag or baggage, may not peruse it with quite so much gusto:—

> 'À Caius College, nous avons la bonne fortune de rencontrer deux étudiants: l'un, en apprenant que vingt Françaises envahissent son appartement, se réfugie dans sa chambre à coucher, nous abandonnant son salon et son déjeuner tout servi: un autre déjà "lecturer," avec l'aisance d'un gentleman, nous fait les honneurs de son chez lui d'abord, puis du collège, dont il nous explique, en excellent français, les souvenirs et les curiosités.'

Most assuredly that lecturer should be decorated, and with equal propriety that deplorable runaway should be rusticated. Eton and Harrow pleased the seventeen exceedingly, as did also the University settlements, of which the ladies visited those of Toynbee Hall and of Bermondsey. But,

> "Pendant ces trois semaines, la question qui nous a le plus souvent occupées, c'est celle de l'éducation,'

and our readers will most assuredly be most anxious to know what 'notes' were made on this most important topic:—

> "En cette matière,' we learn, 'tout diffère de ce que nous trouvons en France: sauf les écoles primaires, encore peu nombreuses, fondées par le gouvernement (les Board Schools), tous les établissements d'instruction, depuis les pauvres écoles de paroisses jusqu'aux collèges d'Oxford et de Cambridge, sont dus à l'initiative privée et sont absolument libres; l'État n'a sur eux aucun droit, pas même celui d'inspection.'

This will cause much rubbing of the eyes amongst the masters and mistresses of the said 'pauvres écoles de paroisses,' who certainly are unaware of the fact that the State has no jurisdiction over them, not even the right to inspect them. Mdlle. Blanc has been sadly misinformed here, perhaps because amongst the many bodies visited the N.U.T. was oddly enough not included.

Under the guidance of Mr. Bruce, M.L.S.B., a typical London Board School, 'un immense bâtiment,' including accommodation for a nursery (école maternelle), an infants' department (école enfantine), boys' department (école de garçons), girls' department (école de filles), deaf and dumb class (classe de sourds-muets), class for children of feeble intellect (classe d'arrières), workshops (ateliers de travaux manuels), and cookery centre (cours de cuisine). The work done for the children of feeble intellect, under the superintendence of Mrs. Burgwin, is justly eulogised:—

> 'Ils témoignent parfois d'une adresse qu'on n'aurait pas soupçonnée chez ces pauvres enfants.'

English infant schools are admittedly the best-taught in the world, hence we are prepared to hear the seventeen speak

well of the école enfantine. Nor are we disappointed. Drill and singing come in for special praise, the power of the piano being credited with the excellence. London Board teachers will agree that 'il y a toujours un piano par école,' although the 'toujours' is perhaps a little too strong. They will, however, open their eyes when they learn that there are schools in which there is a piano to every class (parfois un par classe); moreover, it should have been pointed out to these excellent ladies that frequently the piano is the gift of the children and teachers to the school. How will Mr. Curwen and our tonic sol-faists like being told that, albeit their system has had something to do with the excellence of our school music, the success is to be attributed 'surtout à l'emploi du piano'? Mdlle. Blanc says that a little at a time, and that slowly, is the one happy guiding principle of English school teaching, with which Parisian methods, she bemoans, compare but unfavourably :—

> 'Avec les meilleures intentions on a chargé les programmes et coupé l'emploi du temps de telle sorte qu' à peine maîtres et élèves commencent-ils à s'intéresser à un sujet, il faut l'abandonner pour un autre tout différent qu'on effleure comme le premier.'

Skimming the surface of things is not unknown here, it may interest our neighbours to know; and not only in France but also in England the scholar

> 'Prend la détestable habitude de se payer de mots et de se gonfler d'une apparence de savoir qui lui fait illusion.'

English discipline is praised :—

> 'L'autorité parait très respectée : tous les maîtres d'une même école semblent d'avoir conscience qu'ils collaborent à une œuvre importante, à l'unité de laquelle il faut savoir faire des sacrifices.'

This is high praise, and, we honestly believe, not ill-deserved.

But what will the detractors of the religion of the Board School say to the statement of the intelligent foreigner that the religious sentiment seems to dominate in these schools?—

> 'Le sentiment qui parait dominer tous les autres est le sentiment religieux : même les écoles du gouvernement, l'éducation, en cessant d'être confessionelle, est restée profondément religieuse!'

The irrational size of our classes does not escape the condemnation of the seventeen, nor the fact that raw boys and girls are set to learn their work at the expense of the scholars whom they are expected to teach. In respect to their pupil-teacher system, France is undoubtedly well ahead of us. Next comes a visit to the new Borough Road Training College at Isleworth, where Inspector Barnett and Principal Withers do the honours, whereby the following remark is evoked :—

> 'Les avantages et les inconvénients du système des *pupil-teachers* nous sont indiqués, et ce sont surtout les inconvénients qui nous frappent.'

This should be shown to the worthy members of the newly-appointed Committee of Enquiry as to the woes, wants, and weaknesses of Pupil Teachers.

By way of comfort comes the succeeding paragraph :—

> 'En revanche, nous sentons vivement par le contraste combien l'initiation professionelle est superficielle et factice dans nos écoles normales.'

The position of the girl graduate is regarded as very satisfactory; even the refusal to grant degrees to women by Oxford and Cambridge is not deemed disadvantageous :—

> 'La. considération de la femme professeur nous en a semblé accrue.'

For the rest, these wanderers from the land of 'liberté, égalité, et fraternité,' appear to have been profoundly moved by the large amount of liberty enjoyed by young England of both sexes, their cry being that England is much more fortunate in this respect than their beloved France. Witness the following quotation from Mdlle. Blanc's interesting article :—

> 'En France, nous aimons qu'un élève travaille bien toutes les parties du programme soignant spécialement celles pour lesquelles il est moins doué, afin de rétablir l'équilibre et d'obtenir un ensemble harmonieux; en Angleterre, on fait ce que l'on aime, on le travaille à loisir, mais à fond, aspirant surtout à devenir hors de pair dans une branche quelconque . . . cette éducation fait parfois, parait-il des cerveaux singulièrement forts qui, une fois en possession de la "méthode," l'appliquent d'une branche à une autre avec une remarquable activité.'

This again is high praise, if but partially deserved.

The article proceeds to deal with the self-dependence and self-initiation which we islanders certainly regard as of priceless value. How others see us in respect to this appears from our next quotation :—

> 'On ne perd aucune occasion de developper en eux l'esprit d'initiative et d'association; aussi est-il vraiment extraordinaire en Angleterre et y fait-il des merveilles. La plupart des hôpitaux, des écoles, des églises sont fondés et entretenus ainsi . . . on ne peut pas contenir son admiration pour un peuple qui sait si bien faire ses affaires lui-même.'

The respect shown by English people for the rights of others next comes under notice, only to be applauded in unmeasured terms :—

> 'Si les Anglais aiment la liberté pour eux-mêmes, ils savent admirablement le respecter chez les autres. Le mot *respect* les caractérise bien—respect d'eux-mêmes, respect des droits. Il y a à la fois chez eux—et c'est peut-être le trait le plus caractéristique des mœurs Anglais—plus de liberté et plus d'autorité.'

Such are the generous remarks of a French schoolmistress upon our work and its results; remarks calculated to bring a glow of fraternity to the heart of every reader. Truly, in the words of Inspector Barnett to Mdlle. Blanc: 'Nous avons beaucoup à apprendre les uns des autres,' and certainly this fraternisation is a very seemly, efficacious way of doing the learning. Time was when English schools and English methods of teaching were a byword and a reproach amongst the nations. This was in the unhappy days of the Lowe *régime*, when a M. Braun coming amongst us summed up his experiences in the following caustic words: 'It is highly instructive to visit English elementary schools, for there you find everything that should be avoided.' Much pleasanter is the testimony of the seventeen as related by Mdlle. Blanc, especially as our own knowledge tells us that *now* as compared with *then* exhibits progress along right lines—slow, it is but too true, but sure, and this, after all, is the main consideration.

HER Majesty the Queen has been graciously pleased to accept the dedication of Mr. John Farmer's new book of music, entitled 'Scarlet and Blue; or, Songs for Soldiers and Sailors,' just published by Messrs. Cassell & Co.

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To his numerous contributions to the study of Early and Middle English, Dr. Sweet has now added a *Student's Dictionary of Anglo-Saxon*. It is necessarily based, to some extent, on Bosworth-Toller's *Anglo-Saxon Dictionary*, which is now approaching completion. The head-words are given in their Early West-Saxon spellings, with such restrictions and suggestions as are suggested by practical considerations. Doubtful matter has been excluded as far as possible, though a margin has been left in dealing with well-known texts such as *Beowolf;* and late words have been similarly treated, with a reservation in favour of the later portions of the *Anglo-Saxon Chronicle*. Brevity and conciseness have been aimed at throughout, with the view of omitting what is least essential, and of finding space for what is most important. The meanings are given in plain modern English, discriminating briefly and clearly the different senses of each word; and quotations and idioms have been included wherever space allows. References have been omitted, irregular forms are noticed very briefly, and cognate words are given only in Old English itself, while cross-references are inserted sparingly, and only when likely to prove practically useful to those for whom the Dictionary is intended.—(*Oxford University Press.*)

EDUCATION ABROAD.

THE abuses of the *Certificat d'études primaires* form the subject of a vigorous leader in the *Journal des Instituteurs*. The age limit of compulsory school attendance in France is 13 years theoretically, but the attainment of the *certificat*, granted upon the result of an annual examination, absolves the pupil from further instruction. Since the standing and distinction of a teacher and his school are largely influenced by his success in reducing the age of his little 'graduates,' a system of forcing and cramming is indulged in which puts a stop to all true education. The matter has engaged the attention of that most active body, the Teachers' Association of the Département de la Seine, and was also taken up by the recent Congress at Rouen. The remedies proposed are to make the minimum leaving age 12 for holders of certificates, to make the syllabus more uniform and comprehensive, and to give marks for attendance. The latter expedient would encourage steadiness of application, and relieve the congestion of the term immediately preceding the examination.

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THE annual banquet of the Seine Association just referred to was graced by a fine poem, dedicated to 'The Teachers' by Frédéric Bataille, and published in the same journal. It likens the teacher to a husbandman who sows in the cold and dreary season, looking forward to the summer and its joyful harvest. The concluding verses are well worth quoting :—

Alors on connaîtra que votre tâche est belle,
Que votre œuvre est insigne et vos efforts bénis :
Apôtres généreux de l'idée éternelle,
Vous vous reposerez sur sa force immortelle
Transformant les cœurs rajeunis.

Et quand viendra le soir de ce labeur sublime,
Vous pourrez dans la paix aussi vous endormir,
O semeurs radieux que le devoir anime,
Calmes, le front serein et tourné vers la cime
Où brille l'astre d'avenir.

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THE Hygiene section of the Brussels Exhibition, which is to take place this year, has arranged a competition for the best mode of formulating a series of aphorisms, embodying the most elementary precepts of sanitation and health, to be placarded on the walls of the schoolrooms. This is a very practical and useful suggestion. It might be supposed that such precepts as those concerning the airing of rooms and the use of none but pure water for cooking purposes were generally known and acted upon. But it is just these things that are neglected, from ignorance or carelessness. The expedient proposed would make them part of the flesh and bone of the next generation.

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HERE is the scale of marks for the Belgian teachers in training, culled from the Belgian *Journal des Instituteurs*. It is used for determining the result of the third-year examination : "Conduct, Application, and General Aptitude, 30 ; Religion and Ethics, 70, or Moral Precepts, 35 ; Pedagogy and Methodology, 50 ; Native Language (French or Flemish), 100 ; Second Compulsory Language, 50 ; Arithmetic, 60 ; Geography and History, 35 each ; Natural Science, 25 ; Hygiene (male teachers), 25 ; Domestic Economy (female teachers), 30 ; Design, 20 ; Manual Training (male), 35 ; Needlework (female), 35 ; Gymnastics, 20 ; Music—male, 20 ; female, 30.' The natural science subjects for third-year students are Agriculture and Horticulture.

THE recent vote of the Liège Provincial Council taking over the remaining fifth of the teacher's payment for a substitute in case of illness has had a sequel. The Governor of the province, who was strongly against the measure, asked the King to cancel it. His Majesty, however, refused to do so, and the teachers remain in possession of the field.

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IN Luxembourg they were not quite so fortunate. The Council, after some wrangling, could only be got so far as to agree to recommend the sick teacher for special State assistance !

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AN interesting article on 'Sleep' appears in the New Year number of the *Deutsche Blätter*, by W. Fick. The author pertinently remarks that the phenomena of sleep are less known and studied than the more startling manifestations of psychological laws, just as in ancient days the rare appearance of a comet or an eclipse tended to centre men's attention upon them to the exclusion of more familiar subjects, whose closer acquaintance laid the foundations of modern science. He retails some experiments by various students on the depth or profundity of sleep, and shows that it is deepest in the first hour, and then becomes gradually less intense, and approaches a minimum at which the slightest unusual noise suffices to interrupt it. The method of experimenting was that of Fechner's sound pendulum or acoumeter. This consists of a pendulum in the shape of a hammer, which is allowed to fall upon a sounding board from a measured height. The loudness increases with the height. The experimenter allowed the pendulum to fall every hour, increasing the height till the sleeper awoke. This gave a measure of the depth of his sleep. In practice there must be many sources of error limiting the accuracy of the results. The chief source lies in the fact that the sleeper gradually gets accustomed to the sound, and sleeps over it longer than at first.

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THE Prussian female elementary school teachers are petitioning the Diet to place them on the same footing as the male teachers with regard to initial salary. This is already done in the kingdom of Saxony, and in many towns of Prussia. If there is to be a difference, let it be in the old age pension, and make the latter only 60 per cent. of the initial salary. Thus the female teachers, of whom there are 10,000 in Prussia. They complain, and rightly so, that the initial salary of £36 per annum, increasing to £38 in ten years, is insufficient pay for what are undoubtedly their best and most vigorous years. We hope the *Abgeordneten* will show some gallantry in this matter.

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THE Danish Holiday Colonies have undergone a new development. This time the rural children are taken into the metropolis, instead of the opposite. Last year some 13,000 town-bred pupils were taken into the country, where they enjoyed all the invigorating and strengthening influences of the unwonted green to the utmost. The good folks of Copenhagen asked the country children to return these visits, and give them an opportunity of returning the hospitality. About 2,000 children were brought to the capital last year, where the girls were accommodated in the gymnastic halls, and the boys at the fire brigade stations. Over 300 persons took a child or two into the house for two days. The hospitality went further than this. The children assembled every morning in a large garden, near the station. The bakers of the city sent them bread for their breakfast free, and restaurant keepers and others sent them coffee, milk, soda water, &c. After breakfast the little army divided into groups, and visited the chief attactions of the capital, the Zoological Gardens coming in for the lion's share of interest. The railways gave free passes, the steamers and tramways reductions. The teachers had the freedom of the hotels. The majority of the pupils, and many even of the teachers, had never seen Copenhagen, had perhaps never travelled by rail, much less seen electric light or asphalte pavement. This sounds all quite romantic. Are we too civilized or too matter-of-fact for anything similar ?

EDUCATIONAL matters seem to be at the lowest ebb in the Argentine Republic. The Buenos Ayres Educational Council has no money to pay the teachers, and has had none for months. The Government has voted 100,000 pesos as a subsidy, but the Council has decided not to pay anything at all until all the necessary money is in hand, the above sum not being sufficient. In the provinces it is even worse; some of them are ten months in arrear. Sometimes the money voted for education is spent on other things, and often the subsidies from the Central Government are not sent out. The parents find it cheaper on the whole to keep private tutors.

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NO. 11 of the *Zeitschrift für Gesundheitspflege* brings a fascinating paper by Dr. Combe, of Lausanne, summarising the results of 13,358 child measurements, taken in the seven classes of the national schools of that city during the last ten years. Some diagrams are added, which give point to the main conclusions. They show that a boy grows steadily between 7 and 12, but at a gradually decreasing rate. At 13 he commences to grow in earnest, and at 15 he simply shoots up, maintaining a high rate of development till 19. The average girl grows more uniformly between 7 and 12, so that at the latter age she is taller than the boy. But she makes no spurt at 15 as the boy does, and is overhauled by the time they both attain the age of 19, the disparity continuing after that through life. As regards the various nationalities for which figures are available, the Swiss boys take the second rank, being only exceeded in stature by the Swedes. The older boys are exceeded in height by the Americans and Belgians. The Danes, Germans, and Italians are less tall. Among the girls, the Swedes are the tallest, and the Italians the shortest. The American and Italian girls reach a mature stage of development before the rest.

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ANOTHER interesting fact was brought out by these researches. Children born in the winter months are smaller than those born in the summer months. The best birth month for a tall boy is July, and for a tall girl August. There has long been a deep-rooted popular impression to the same effect, but it is interesting to find it confirmed by careful and extensive measurements.

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A propos of child measurements, we find a review of an amusing book on the subject in the December number of the New York *School Bulletin*. The author goes under the pseudonym of 'Dr. O'Pshaw,' and the book is really a travesty of the modern official 'craze' for this department of pedagogy. The 'Doctor,' who graduated in Germany, obtained a situation, after many vicissitudes, as teacher of a small district school with 19 pupils, boys and girls, and forthwith proceeded to put his ideas into practice.

'Dr. O'Pshaw devoted the first two days of school to a course of measurements of the pupils, in accordance with the minute specifications now given in most child study blanks. They involved so much detail, that he is careful to explain that the measurements of the girls were made in the entry by one of the older girls, and only the results were communicated to him. Even then he had some difficulty from the fact that the modern theory of child study had not been fully disseminated in district No. 31. On the afternoon of the second day he heard a formidable noise in the road, and looking out saw a huge Irish woman rushing toward the school-house with Amazonian strides, brandishing a rolling-pin, and calling out: "Show me the man that is measuring my daughter's hips with a tape line, and putting them down in a book!"'

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WE cannot follow Dr. O'Pshaw through his many adventures, which ended in his dismissal, but a few of his child observations, on the model of Miss Haskell's book, are worth quoting :—

'GROUP I. AGES BETWEEN 1 AND 3.

'87. JOHN. Age 2 years. I watched this child for twenty minutes, and this is what he did. He came out of the house and set off at a trot round and round the house. He looked serious. Now and then he stopped. A girl came out of the house, and attempted to stop him. He shook her off, saying: "I am going o be a horse," and began to trot around the house again. The fact that he trotted around the house showed that he really was imitating a horse. If he had been imitating a seven-year locust, he would have trotted over the house.

'175. JAMES. Age 2 years 8 months. I took James into the garden to pick a violet. Yesterday he went into the garden himself. In fact he has long been in the habit of going there every day.

'1151. UNKNOWN. Age about 12 years. This boy, who was in an electric car, made no movement to pay his fare until the conductor came in front of him. He then put his hand in his pocket, and pulled out a handful of money. With the forefinger of his left hand, he pushed the pieces of money about until he had counted out five cents, which he gave to the conductor. There was nothing very peculiar about this, but I put it down because I was short of observations for that day.'

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THAT the 'rational' bicycle costume is not much more at home in America than it is here, is evident from the following story from New York :—

'Miss Mamie Owens, of G. S. 10, is an enthusiastic wheelwoman, and, like many other teachers, has come to school in bicycle costume, changing it before entering the class-room. She was detained at home one morning, and reached the school a little late. She found the dressing-room locked, and the janitor in another part of the building, so she went directly to her class-room in her bicycle costume. The 65 boys began to giggle, and then to shout, and she was obliged to go to the dressing-room and change her dress.'

If she had quietly faced out a few lessons, the boys would probably have ceased to shout by this time.

THE INSPECTOR'S NOTE-BOOK.

BY AN INSPECTOR OF SCHOOLS.

'A February face
So full of frost, of storm, and cloudiness.'
(*Much Ado About Nothing.*)

'Ring out the old, ring in the new.' The old year, at one time so big with events calculated to make history in the educational line, is gone beyond recall. We have just got well within the threshold of our new friend 1897. May this be a propitious year for education! With secondary education, aid for the voluntary schools, and pensions for the veterans of the teaching ranks—who knows that this may not prove a record year?

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The teaching of Geography. The teaching of Geography has been engaging my attention in schools of late. I find many admirable points in the methods, and some questionable features. It appears to me that this new system of inspection affords us ample opportunity to test the methods. For instance, I go into a school at the end of the fourth month, say. The teacher informs me that her first class has just completed the geography of France. I put her on to question, and this is something like what occurs :—

What are the boundaries of France? Name some rivers. What town is on the Seine? What town is noted for woollen goods? Name any other towns in France? What are the productions?

In a very few minutes the teacher turns to me to know whether she has asked enough questions.

And this is a frequent occurrence. Teachers too soon exhaust their knowledge. Again, Standard III. have just completed the geography of Wales, so I am told.

I give the teacher as long as she likes to show me what she has taught them under this head. It is with great difficulty she can keep going with suitable questions, and she not infrequently leaves off without touching many of the really vital points. The children do not know that Glamorgan is *the* county of Wales, why it is so important, why the population is so great there, what the great industries in Wales are, &c.

Another teacher has been doing India thoroughly, without giving any instruction upon the Monsoons.

A teacher should have a thorough knowledge of her subject. If one allows a teacher to question, she has a splendid opportunity given her, not only to show what has been taught, but how it has been taught. It may happen that only a few answers are obtained, yet one can tell by the questions that the teacher knows her subject, and knows how to teach it. I am afraid many have not yet gone in for the broader teaching, which the new code demands. In many cases, especially in Geography, I am convinced that the teachers have not a thorough knowledge themselves. The teaching might well be more general. For instance, there are general laws affecting the climate; why then should the climate of each country be taught by itself? The same laws apply to New Zealand as to Ireland. The centre of Canada and the centre of Europe have continental climates. It is the same with productions. Within the tropics we get what is generally known as a tropical climate, and consequently tropical productions.

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Associate one part of the subject with another. Why should the productions be learnt apart from the climate? Why should not the productions of the various tropical countries be studied at one and the same time? The interdependence of one portion of a subject upon another is nowhere so clearly obvious as in Geography.

Take Ireland again. Here is a train of questions :—

What is the prevailing wind in Ireland? S. Westerly. What has the wind been crossing? The Atlantic ocean. Whether will it be a wet or dry wind? Wet. What will it bring then to Ireland? Plenty of rain. What is the chief characteristic of the climate? It is wet. As a consequence what grows well? Grass. And so Ireland is sometimes called——? The Emerald Isle. There being plenty of grass, what should you think the farmers will keep? Cattle. What then is one of the great industries? Cattle-rearing. What is done with these cattle? Many are exported to England. What is obtained from the cows which are kept in Ireland? Dairy produce.

On the blackboard at the finish I may have something of this sort :—

Prevailing winds (S.W.) bring rain to Ireland. The rain causes grass to grow, providing food for cattle, which are exported, along with dairy produce.

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The teaching should be of a wider type. In Standard II. even I would frequently make use of a map of the world. The little ones want as much illustration as possible to enable them to grasp the ideas indicated by the words ocean, continent, sea, &c. This reminds me that in the other Standards I often find that too much reliance has been placed upon *one* map.

To refer again to Ireland, I often inquire whether the children have seen Ireland marked on the map of Europe. It seems to me, its position with regard to the Atlantic Ocean and the continent of Europe, is much more important than the fact that Protestants live in Ulster and Catholics in the other parts. The same applies to the other Standards. Often I find that children know a lot about India without ever having seen where it stands on the map of Asia, or its position as regards the Equator. Then again the lines of latitude on a map are very important. Cannot a child be taught to learn something about the position of a country from the lines of latitude, without taking up seriously the study of latitude and longitude? I think so.

Answers to Correspondents.

D.M., writing from the Orkneys, consults me upon a question which may be of interest to many. It appears that the father of one of his scholars has written to him objecting to his son being taught a language. This lad had already passed the first stage in this subject. D.M. wants to know whether the parent has the right to interfere in this way.

This is a case needing much tact. If practicable, call on the parent and have a friendly chat with him. Point out to him the advantages of Latin in training the mind. You may be able to arrange a compromise. A schoolmaster should always endeavour to obtain the co-operation of the parents. If *several* object to Latin, why not take up another specific instead? If, as you say, the whole discipline of the school is at stake, then brook no interference. The parent has no right *per se* to interfere at all with the recognised curriculum.

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J.W.D. is informed that the Department need not be consulted at all upon the subject of one year's training, providing he has passed the 2nd year Certificate Examination.—All the necessary arrangements have to be made with the authorities of the particular college he proposes to enter. As the college year begins in September, he will be unable to enter until 1898, because the 1897 list will not be out in time. The article is *not* limited to certificated teachers of some standing.

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J.W.F. is informed in reply to his queries respecting the Certificate Examination :—

(1.) That it is not compulsory to take the 300 lines from one author only. Mr. Horobin's plan appears to me a good one. It assists one in studying the text of all the authors.

(2.) That he can *not* take two sciences in addition to groups (*a*), (*c*), and (*f*), 2 and 3. It is distinctly stated in the certificate syllabus, that no more than two groups can be taken in addition to English. *Vide* page 276, November number, answer to a correspondent.

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T.P.—Your Pupil Teacher will not be entitled to any grant at all. From the report you send it is evident he has obtained below 40 per cent. of the marks taken together in Geography and History. No matter how well he may have done in his other subjects, no grant is given if less than 40 per cent. are obtained in any one of the starred subjects (Geography and History form one). You are right in concluding that in all other subjects above 50 per cent. were obtained. I do not think you could see the papers. Of course, you would be quite at liberty to write to the Department on the point.

'A QUEER SHILLING.'

A SCHOOL PLAY FOR BOYS.

BY JOSEPH DESPICHT.

Author of 'A "School Play," and How to produce it.'

Characters and Dresses :—

Doctor Daymond -	Head Master of Grammar School (black gown, college cap, etc.).
Frank Meadows -	Captain of school cricket team (ordinary cricketing suit).
Mr. Meadows - - -	A gentleman farmer (grey coat, knee-breeches, buckle shoes, felt hat, etc.).
Percy White - - -	A boy (about twelve) in Grammar School ('Eton' suit).
Umpire - - - - -	(Long white linen coat, felt hat.)
A Constable - - -	(Usual costume.)
Jack Cheap - - -	A nondescript (tall hat gaily trimmed with bright ribbons, shabby military cloak, knee-breeches, worn shoes, carries a pedlar's box slung from shoulders).

Cricketers and Schoolboys *ad lib.*

Time.—Six o'clock in the evening.

Scene.—The Cricket Square behind Grammar School. Wicket gate at L.

Discovered—A group of cricketers and some boys in ordinary clothes. All talk loudly as curtain rises.

Arthur Strudwick (*an opposing player*): I say it was out! And a jolly shame it is that the umpire did not say so too!

Some others (*home players*): No, no! No, no!

Arthur Strudwick: It was a fair catch, and your umpire ought to have given it out.

Charley Wagstaff (*home side*): It was caught beyond the boundary, and was therefore no catch at all!

Arthur S.: Stuff of nonsense! It never touched the ground or anything else, and was a better catch than any of you fellows ever

made in your lives. I say we won the match, whatever your old umpire likes to declare!

Others (*as before*): No! No!

Alfred Keene (*joining group*): Halloa! What's the matter? Who's who? What's what?

Bertie Gordon: Oh, only a dispute about a catch! Weren't you at the match?

Alfred K. (*face bound up*): No, not at the finish. I've got this beastly neuralgia, and I had to feed my white mice at six. What's the row about?

Charley Wagstaff: Look here, Keene, Frank Meadows——

Frank Meadows (*approaching, bat in hand*): Never mind me, now! I can't give myself out, can I? But here's the umpire. Hear what he has to say.

Umpire (*joining the group*): I say, you Sittingbourne fellows, I'm awfully sorry this dispute has arisen, but I gave Meadows 'not out' and I stick to it.

Several (*opposing team*): Shame! Shame!

Charley W. (*to Umpire*): Tell Keene about it, and let us have his opinion,

All: Hear, hear!

Umpire: Look here, then. Sittingbourne had been in and had scored just ninety-nine runs. At one minute to time our fellows had made ninety-six for nine wickets. So we wanted four runs to win, and had one minute to get them in. I called 'last over,' fully expecting a drawn game. Frank Meadows played the first four of the over quietly back to the bowler; but the fifth ball was a Yorker well up on the leg side. This Meadows swiped tremendously to square leg. The ball rose high, and the Sittingbourne Captain just managed to catch it by jumping on one of the boundary forms, and taking it in his right hand just beyond the boundary line! If Meadows was out, Sittingbourne wins of course; but if not, Meadows scores four for the hit and the Grammar School wins by one!

Arthur S.: Well, I say again, your Captain was out, as the ball was caught before it touched ground!

Umpire: And I say he was not out, because the ball had passed the boundary before it was caught! ('*Hear, Hear!*' and '*No, No!*' *from the opponents.*)

Umpire: What do you say, Keene?

Alfred K.: I never heard the question raised before, but I say like a rum old umpire once said, 'He's not out this time, but he mustn't do it again!'

Umpire (*to opposing eleven*): Well, gentlemen, you know I want to be fair, so this is what I'll do. I'll put the question in a letter to the Marylebone Cricket Club, if you will all abide by the answer.

Frank Meadows: I'll answer for the Grammar School!

Arthur S.: Good! And I'll answer for Sittingbourne!

All: Bravo! Bravo!

Enter, by wicket-gate, Jack Cheap. (*He carries a tray or box of sweetmeats, etc.*) *Sings* (*as he enters*):

> Hurrah, for a soldier's life!
> Hurrah, for all pother and strife!
> Hurrah, for the time when the fighting's done,
> And you've nothing to do but enjoy the fun
> Of kicking your heels in the air!

Frank Meadows: Halloa! Halloa! What's this? Who gave you permission to enter that gate?

Jack Cheap: Don't be cross, young gentlemen! I have the Doctor's own permission to show you my wares. 'Let them have some of your famous stick-jaw,' said he, 'and I warrant they won't speak in class for a week!' Now then, those little villains who have no money stand behind and enjoy the fun? Those fine fellows who have even a copper left may stand in the front seats! You can't all have a *stall*, for there's only one in the show, and that's mine! (*taps his box smartly*).

Charley W.: Here, say something better than that, or we'll put you and your *stall* out of the gate!

Jack C.: Now, there you're wrong, gents. I defy the world to put me out. I'm too good-tempered! But what do you say—shall we have an auction? You can then have my dainties at your own price! I have an engagement with the Prince of Wales and all the Royal Family at seven, and have got to shave first. I dare not take any of these things home, or my mother-in-law will beat me! Now, who's for an auction? I shall want a clerk, of course!

Charley W. (*to the other boys*): What do you say, boys? Shall we have some fun with the Johnny?

All: Yes! Yes!

Charley W.: Sling the boundary seats round! Let's have a regular show! (*They move benches to face the pedlar, and some mount them. The elder boys remain on the grass, Frank Meadows in the rear. Jack Cheap, on L., mounts a discarded 'Lemonade' box, or any such thing lying about.*) Here, what's-your-lovely-name, I'll be the clerk! (*He places himself in front of Jack Cheap.*)

Jack C. (*in monotone*): '1,' said the lark, 'if it's not in the dark, I'll be the clerk!' Shakespeare, ahem!

Bertie Gordon: Now then, start away! The bell will be ringing for prayers soon!

Jack C. (*to Charley W.*): Stand here, sir, and make your bow to the company. (*He bobs Charley's head.*) Your duties will be to hand the goods to the buyers and the money to me. (*To all.*) I lose, bear in mind, on every bargain; but I don't mind that, as I intend to send all the money I lose to a charitable institution! Now! Let me show you lot number one. It is a grand pianoforte mouth organ. (*Holds one up.*) It is the only organ that has found the chord Sir Arthur Sullivan lost! Listen! (*Blows all the notes at once.*) That is the lost chord itself!

Alfred K.: Then I wish you had never found it! I shall have this horrible toothache a week longer in consequence!

Jack C.: Come, lads, what shall we say for the organ? Who'll give it a start? Hold it high, clerk, and let them wonder as they gaze! (*Charley plays a few hideous passages on it, and holds it aloft.*)

Bertie G.: One penny!

Jack C.: Don't insult a work of art! Come to silver, if you please!

John Gleeson: Tuppence!

Jack C.: Tuppence? Tuppence is low, very low. What say the nabobs over there?

Will Bryceson: Tuppence-ha'penny!

Jack C.: Ha'penny did you say! Never heard of such a coin! Any advance on tuppence-thing-a-my-jig?

Will B. (*carefully counting his money*): Here, I'll go to threepence!

Jack C.: That's better! Now we shan't be long! Going at threepence! A grand piano going for threepence! Going, going, gone! Hand up the bullion, clerk, and give the gent the prize. (*Charley W., Will B., and another blow the instrument.*)

Now, here's lot number two! An acid-stick! Cricket's thirsty work to anyone who doesn't possess an acid-stick! An acid-stick like that would quench the thirst of a whole team of cricketers. Taste it yourself, clerk, and tell the others what you think of its wonderful flavour. (*Charley W. sucks the acid-stick vigorously.*)

Charley W. (*smacking his lips*): Finest stuff in the world this end! I'll try the other. (*Sucks again.*) That's all right, who'll try next?

Jack C.: Now, my lads, who says sixpence for the acid-stick! (*All laugh.*)

Bertie G.: Take it home to the baby!

Jack C.: Here, fivepence, fourpence, threepence! I'll ask no more and I'll take no less—who says tuppence for what's left of the acid-stick?

Charley W.: I'll give you a penny for what remains, and owe you a penny for what's eaten! Is it a bargain?

Jack C.: The acid-stick going for one penny! Going, going, gone! (*Charley W. throws a penny into the box and goes on eating.*) I'm sorry to part with it, though, for it has been the comfort of my large little family for weeks! (*Charley W. throws it back into the box in disgust.*)

Now, what shall I offer you next? Here's a baa-lamb that recites in low Dutch—'twas made in Germany—'Mary had a little sheep.' Listen! (*He makes a toy lamb squeak. Gives it to Charley W., who does the same.*) No bid! No bid! I see you're too big for that. Here's a set of trays for those going in for housekeeping. They are so bright that you can always see yesterday's dinner in them! (*He hands a tray to Charley W., who looks at himself in it, as he makes a few grimaces.*) No bid! No bid! I see you're too little for that! But what shall we say for the silver watch that went to India, and came back because it stopped there! (*Boys tap their pockets and shake their heads.*) Too dear? Too dear? Well, what for the telescope that gives you a peep into the middle of next week at one end, and shows you your great-great-grandfather taking snuff at the other. Too dear, again! I'll tell you what I'll do! I'll show you something that I wouldn't show to any other boys in Kent, if you'll only give me a bid!

Charley W.: Trot it out! They'll bid!

Jack C.: My Aunt Maria said I ought to keep it for myself, and on her knees implored me not to part with it! Who'd like to be a soldier? Who wouldn't, I should like to know? Well, here's a treat for the lad who would like to be a soldier.

Frank Meadows (*coming eagerly forward*): Show it! What is it?

Jack C.: Ah! that's my secret! You'll have to bid before you see it; but when it's yours you may show your friends your luck. It's small—this little box contains it—but it glisters like silver

sheen! It is a talisman that has led thousands on to fortune. Now then, for the first bid!

Frank M.: If it's good for a soldier I'll give it a start at sixpence, and chance what comes of it!

Charley W.: Well, Frank, you are green! I've had enough of this. He takes us for yokels. I'm off to see the Sittingbourne 'Ajax'-es who are sulking in their tents. Who's coming?

Several boys: I am! I am!

Charley W.: Don't bid against yourself Frank, and you'll get the 'lot' for sixpence! Ta, ta! (*All but Frank scamper off.*)

Jack C. (*shutting box and pulling Frank's sleeve*): I say, my fine fellow, what are you doing *here?*

Frank M. (*sharply*): What do you mean, pedlar?

Jack C.: Scored fifty off your own bat, did you? Look at your arms! Look at your chest! Look at your height! Captain of your school, are you, and a head and shoulders taller than any of the rest?

Frank M.: What is that to do with you? Show me what you have in that little box!

Jack C.: Ah! I was forgetting that, looking at your fine limbs! Take it, yourself, and see what it is.

Frank (*opening box*): A shilling.

Jack C.: Ha, ha, ha! A shilling! *A Queen's shilling!* Queer, isn't it?

Frank M.: What is this to do with me? *Who* are you? *What* are you?

Jack C. (*handing a paper*): Read that!

Frank M.: A recruiting sergeant! You a recruiting sergeant?

Jack C.: No more! No less!

Frank M.: And I have taken 'The Queen's Shilling'?

Jack C.: No more! No less!

Frank M.: How did *you* guess I wanted to be a soldier?

Jack C.: Why, anyone can see you are cut out for one! A strapping fellow like you would be lost at any other business. Let's see. You are about eighteen now; in five years' time you ought to have a commission in the Royal Engineers—that is—if you don't get—ahem!

Frank M.: Get shot first! I'm not afraid of that, for I'm not in luck's way!

Jack C.: Now, we have no time to lose! Give me your hand on the bargain! The others will be back soon. We must get away without their suspecting anything!

Frank M.: I shall not be missed till night, and we could get to Chatham by then.

Jack C.: There's a train to Chatham in an hour. Slip to your room, tie up in a bundle anything worth taking, especially your watch and jewellery. Then hurry to the edge of the wood across the London Road. I will have a disguise ready for you, and we can get back to the station without a soul being any the wiser!

Frank M. (*going towards wicket-gate*): I'll be there! (*gives his hand to Jack C.*) You may depend on me!

Jack C. (*going, but calling back*): Don't forget your watch and money—they may be useful!

Frank M. (*returning from gate*): Oh! what will dad say when he hears what I have done! The thought will kill him!

(*As he says this Percy White enters and staggers up to him.*)

Percy White: Oh, Frank, Frank, don't be angry with me! I've—I've heard a great deal of what you and that man have said!

Frank M.: You little eavesdropper! I've a great mind to break every bone in your body! How dared you listen?

Percy W.: I didn't listen, Frank, and yet I heard! I was running in at the gate to say how proud I was that you had made your fifty, when I saw that you had a strange man with you, and I drew back for fear of seeming rude. Thinking no harm, I stood where your voices just reached me. When I realised what you were talking about I tried to run away, but my knees shook, and I seemed rooted to the spot! Oh, don't be angry, Frank; you have never said a harsh word to me till now, and I love you better than any brother could!

Frank M. (*smoothing Percy's hair*): If I spoke unkindly I was mad! You are as dear to me as a little sister even, and I was a brute to threaten you. So you heard something? What was it?

Percy W.: That you were going for a soldier! You'll make a fine one, Frank! You have no mother, I know, but what will your father say?

Frank M.: Don't think I've been caught like a silly goose. Read what my father sent this very morning—but read quickly! (*Gives Percy a letter.*)

Percy W. (*reading*): 'My dear Frank,—I am utterly ruined! Unless a miracle happens, the farmhouse must be sold over my head. This must be your last day at school. I shall come for you to-morrow.—Your broken-hearted Father.' Poor dear Frank, I'm very, very sorry!

Frank M.: I made up my mind this very morning to take the step that chance has thrown in my way. Tell no one, not even the good Doctor.

Percy W.: And not even your father, Frank?

Frank M.: My father? Yes, Percy, you may tell my father *when you see him!* Good-bye, little chappie! I shall slip in and out again by the front way! Good-bye! Good-bye!

(*Lifts him from ground and kisses him.*)

Percy W. (*calling through gate*): Good-bye, Frank! I shall keep my word! Will you take my new knife with you?

(*Returns to centre of stage.*)

Enter excitedly from R. a group of boys.

Several at once: Where is he? This is where we left him!

Percy W.: What's the matter, all of you? Who are you looking for?

Charley W.: That scamp! That pedlar fellow! Quick, which way did he go?

Percy W.: I can't see through a brick wall! What has he done?

Charley W.: Done? What hasn't he? He has stolen at least half a dozen watches, besides a lot of money. All the Sittingbourne fellows' pockets have been rifled and some of ours! Did he pass out of this gate?

Percy W.: You are on the wrong tack altogether! I'll answer for it that the man with ribbons in his hat is not the thief. You must look somewhere else.

Charley W.: That's all very fine, but what do you know about it? However, we've sent for the Doctor and here he comes.

Enter Doctor Daymond (*all remove and replace caps*).

Doctor D.: Boys, what is this I hear? Money stolen—watches taken—pockets rifled!

Charley W.: Sir, we and the Sittingbourne team left our clothes as usual in the cricket tent, and after the match was over we discovered, to our horror, that some one had been in the tent, and carried off all the valuables he could find!

Doctor D.: Do you suspect any one?

Arthur Strudwick: Yes, sir. The queer-looking man, to whom you gave permission to sell his sweets and things on the ground, was seen about an hour ago prowling near the dressing tent, and now he has disappeared?

Doctor D.: Stay! I have given no one permission to enter the square.

Arthur S.: He said you told him to sell your boys as much stick-jaw as possible, to prevent their talking in class.

Doctor D.: No doubt that is the thief! Who saw him last?

Percy W.: I think I did, sir! But he could not have taken the things, for he was a recruiting sergeant!

All: A recruiting sergeant!

Doctor D.: A recruiting sergeant in these grounds? How do you know?

Percy W.: I have promised not to tell, sir!

Doctor D.: Did he threaten you?

Percy W.: I only saw him for an instant, and no words passed between us; but I beg of you to look elsewhere for the thief before it is too late!

Charley W.: Let us find Frank Meadows first, sir! We left him with the 'Auctioneer' on this very spot. I'll call him. He'll hear me if he is within a mile. Frank Meadows! (*calls again through gate*) Frank Meadows!

Enter Mr. Meadows.

Mr. Meadows: That is my name, young gentleman, but why do you call it so lustily? (*To the Doctor.*) I beg your pardon, sir, for intruding so unceremoniously. You are the Head Master, I know, though doubtless you have quite forgotten me. My name is Mr. Frank Meadows, father to one of your scholars.

Doctor D.: I am very pleased to see you. I hope you bring no bad news.

Mr. M.: I am very agitated, and scarcely know what I say. But this I know: I want to see my boy immediately!

Doctor D.: We were searching for him as you entered the gate.

Mr. M. (*excitedly*): Is he missing then?

Doctor D.: We have had a robbery here, and we are trying to catch the thief.

Mr. M.: Robbery—thief—Frank missing! I fear I cannot put two and two together. But you don't mean to say that Frank—my darling boy—is suspected!

Doctor D.: Oh, no, no, no! Pray don't think that! Frank is miles and miles above suspicion, and is my very dear young friend to boot. We want Frank to help us catch the thief, as he was seen with him last.

Mr. M.; Thank you. I shall be calmer soon!

Percy W. (*coming forward*) : Are you indeed Frank's father ?

Mr. M. : Yes, my boy !

Percy W. : I can hear you are, for you have the same kind voice as Frank. (*To Dr. D.*) May I tell him, sir, where Frank has gone ?

Doctor D. : Yes, certainly, if you know.

Percy W. : Try to hear the news bravely, Mr. Meadows. Frank has taken 'The Queen's Shilling,' and has gone for a soldier !

All : Gone for a soldier !

Mr. M. : My boy gone for a soldier !

Doctor D. : Be calm, I pray you ! Tell us, Percy, all you know. There may be time to save him yet !

Percy W. : I was walking in the town about six, sir, when one of the day boys met me and told me that Frank had made fifty runs in the cricket match, and I ran here to tell him how pleased I was ; but as I was entering the gate I saw him talking seriously to a queer man with ribbons in his hat.

Charley W. : That's the man, sir !

Percy W. : I cannot tell all that passed, but I heard the man declare he was a recruiting sergeant, and I heard Frank accept the shilling. It was in a little box, I think.

Charley W. : That's so, Percy. I see the trick now.

Percy W. : And I heard Frank give his word that he would be ready to catch the next train to Chatham.

Doctor D. : But why did you not say this before ?

Percy W. : Because Frank, who is like a big brother to me, made me promise to tell no one but his father.

Mr. M. : Thank you for keeping your word, dear boy. It was right that I should know of this first ! Did he mention any letter he had had from me, my lad ?

Percy W. : He showed me a letter from you, saying you were a ruined man, and that this must be his last day at school !

Mr. M. : Unfortunately, I had written such a letter !

Percy W. : He told me that as soon as he read it he made up his mind to go for a soldier, and destiny seemed to throw the recruiting sergeant in his way.

Mr. M. : I see it all ! He would not be a burden to me, my noble boy ! And to think, Doctor, that I have hastened here with the most joyful news, only to find myself too late—too late ! Good-bye, Doctor ; good-bye, boys ! Thank you for all your kindness to Frank. I must find him if——

Jack Cheap (*outside gate, singing as before*) :

Hurrah, for a soldier's life ;
Hurrah, for all pother and strife, &c.

All the boys : Why, what's that ?

Charley W. : Hark ! That's the voice of the pedlar, or whatever he is ! Frank cannot be far off ! (*runs to wicket gate*) Frank ! Frank !

Constable (*outside*) : All right there ! We're bringing up the luggage !

(*Mr. Meadows retires a little to the rear. Then enter Jack Cheap, without his box, and much battered about ; Frank Meadows, with a bundle, and a Constable in uniform.*)

Jack C. (*with bravado, between Frank and Constable*) : Gentlemen, we will now proceed with the sale ? Where's the clerk ? Who'll make first bid for the life-size figure of a County Policeman ? (*takes Constable's truncheon and uses it as a showman's wand.*) He's as large as life and twice as natural, though he has a wooden head ? Who says a 'bob' for a Policeman ?

Constable : Here, stop that palaver, or I'll clap you in the lock-up in less than no time. (*To Frank.*) Will you look after him, sir, while I give my hinformation to the Head Master ? How d'ye do, sir ! (*bows to Doctor D.*)

Jack C. : Now the next lot I shall call your attention to——

Frank M. : Be quiet, sir, or I shall have to gag you with a cricket cap and belt !

Jack C. : All right, 'Captain,' have you got a shilling you could lend me ? (*Frank shakes his fist at him.*)

Constable : Now, if this precious scamp can be quiet, I'll explain why I am here !

Jack C. : Oh ! If the matter is private I'll withdraw ! (*attempts to escape.*)

All : Stop him ! Stop him ! (*Constable and Frank secure him.*)

Constable : This afternoon, we at the police station had a wire from London to say that a notorious thief, named Harry Cobb——

Jack C. : That's my brother, gents ! We're as like as two peas in a pod—— (*Frank silences him.*)

Constable (*resuming*) : And passing under many *aliases*, had, in the disguise of a pedlar, taken a ticket for here, Faversham. Acting on this, I was deputed like to watch that the light-fingered gentleman came to no harm.

Jack C. : Thank you very much !

Constable : I saw him arrive, and kept my eye on him for some time, when I suddenly lost sight of him in this neighbourhood. After an hour or so, I saw his gay ribbons pass quickly along the Ospringe Road towards the wood that lies a little way out of the town. He entered the wood, and so did I, just to see what his game was. I managed to creep quite close to him so that I could almost hear him breathe ! I had not crouched there long before who should come quickly towards the spot—perhaps, howsoever, I had better let the young gent himself continue the story.

Jack C. : Shall I take a turn ?

(*Charley W. takes charge of Cheap.*)

Frank M. : Sir, it matters not now, perhaps, how or why I came to that particular spot, except to tell you that I had been enticed there by this precious scamp. As soon as I had entered the fringe of the wood, this rogue started up, stick in hand, and threatened to kill me, if I did not at once hand over my bundle, watch, and money. Seeing I had a thief to deal with, I sprang at him, and just managed to ward off a tremendous blow aimed at my head ! The stick slipped from his grasp, and I prepared to close with him, but he drew a pistol from his pocket, and pointed it at my breast. Next instant his arm was knocked up from behind, and he found himself in the tender embrace of our friend No. 9 !

Constable : No thanks to me, sir, for the youngster had knocked all the fight out of him first, and the pistol, you see, was only a toy one. (*Gives pistol to Frank.*)

Jack C. : Next lot on the catalogue is a lovely toy pistol——

Charley W. : Be quiet, or I'll be auctioneer, and knock you down for nothing !

Doctor D. : But I understand that this fellow is a recruiting sergeant, that Frank Meadows has accepted the Queen's Shilling, and——

Frank M. : Stay, sir, how do you know all this ?

Doctor D. : Percy White has told us that by chance he overheard——

Frank M. : Percy White ?

Doctor D. : Yes !

Frank M. : Come here, Percy. Have you really told them what you promised to conceal ?

Percy W. : I have told them all, Frank !

Frank M. : You gave your word you would not do so !

Percy W. : I promised that I would tell no one but (*brings Mr. Meadows forward by the hand*) *your father, Frank !*

Frank M. : Father !

Mr. M. : My dear boy, I know the worst ! I could have now wished to keep you with me, but you have pledged your word, and I suppose you must go !

Constable : Beg pardon, sir ! Did I hear rightly that the young gent had taken 'The Queen's Shilling' from this beauty ? May I look at the coin ? (*Frank hands it to him ; he tries it in his teeth.*) A *queer* one ! I thought as much ! (*Throws coin to boys.*) But this chap is no more a recruiting sergeant than I am !

Mr. M. : Not a recruiting sergeant ! Then Frank is free !

Constable : As free as the air !

Frank M. : But your letter, father—the terrible ruin——

Mr. M. : Why, Frank, I came in haste to tell you that by this morning's post I received word that a rich relation had left me a legacy of ten thousand pounds. So that letter need never have been written, and you are at liberty to remain at school as long as you please !

All the boys : Bravo ! Bravo ! Three cheers for Frank !

Charley W. : But I say, Constable No. 9, this is all very fine, but where is my watch, and Bull's, and Bryceson's ? Perhaps the *sergeant* has enlisted them too !

Constable : Oh ! some watches lost, are there ? I'll soon see where they are ! (*Searches Cheap without success.*) Take off that hat, sir !

Jack C. : I cannot ! A soldier never takes off his hat, even before the Queen !

Constable : I respect the sentiment, so I'll take it off for you ! (*Discovers watch in lining of hat.*) Halloa ! Whose is this ? And this ? And this ? (*Boys claim them.*)

All the boys : Bravo, Robert ! Bravo !

Jack C. : Gentlemen, I am a bad lot, I know, but I am the only lot I have left for a last bid. Will anyone say anything for a broken-down rogue like me ? I was once like these lads, and now I am not fit to breathe the same air with them !

Doctor D. : Boys, I have noticed some marks of better things about this poor fellow, and amongst them a touch of good humour, possessing which no one is, I believe, hopelessly bad. Shall we give him a last chance ?

All : Yes, sir ! Yes !

Jack C. : No, you mustn't, boys, I don't deserve it ! Brought up at a school like this, supplied with everything that fond parents —hark ! what sound is that ? A bell ? Such a bell used to call us boys to evening prayers ! Do you not hear it ?

Percy W. : We hear nothing, my man ! 'Tis your fancy.

Jack C. : It is my own innocent boyhood rising up in judgment against me!

Doctor D. (*looking at watch*) : 'Tis ten minutes to seven, and our own bell that warns us to prepare for chapel should be ringing now. Hark! It begins! (*Bell rings for chapel.*) This is very strange! Look at me, my man! Since boyhood, have you ever received full and complete pardon for any of your numerous crimes?

Jack C. : Never, that I can remember!

Doctor D. : Can you forgive him, Frank?

Frank M. : I fancy, by the look of his hat and coat, he has something to forgive in me! But seriously, sir, I really believe his violence was intended to frighten rather than to hurt me.

Doctor D. : And you, Wagstaff?

Charley W. : Oh, we don't mind, sir! If he had not taken our watches, they might have got stolen, you know!

Doctor D. : Can you pardon him, No. 9, for all the trouble he has caused you?

Constable : Don't mention it, sir! I've enjoyed the job immense!

Doctor D. : Then we one and all forgive you, but on this condition: that you settle down here and lead an honest life under our very eyes. Do you promise? It may be your last chance!

Jack C. (*overcome, and kneeling*) : I promise! I promise!

The boys : Bravo! Bravo! [CURTAIN.

OUR SCOTCH LETTER.

Annual Congress of E.I.S. The Annual Congress of the Educational Institute of Scotland was this year held at Aberdeen, and, thanks to the efforts of the local association, aided by the various educational and civic authorities of the Granite City, was highly successful. There was a large attendance on both days, and there was quite a number of Members of Parliament present, who evinced keen interest in, and sympathy with, the wants and aspirations of the teaching profession, as embodied in the various papers and resolutions.

Reception. Principal Sir William Geddes welcomed the Congress on behalf of the University, and expressed the opinion that it was right and proper for the teachers of Scotland to meet and discuss the newest and most comprehensive educational questions. He also referred to the relation of the University to the public schools of the country, and said he was afraid that relation had been greatly weakened by the recent policy of the Universities Commission.

President's Inaugural Address. President Adams then delivered his inaugural address, in which he justified the holding of these congresses, and, in his own racy way, showed that the subjects of the papers were just such as were needed to inform the minds of the profession and the public generally. During the delivery of his address the President was frequently applauded, and his touches of humour were thoroughly appreciated.

The Parochial Idea. Mr. Chas. M'Pherson, M.A., Aberlour Public School, read a paper on 'The Parochial Idea—from Public School to University.' In looking at the situation as it presented itself to-day, Mr. M'Pherson said that, judged by the University tests, and the Leaving Certificate and other public examinations, the rural schools were doing a large amount of sound secondary work, and there was no doubt that these schools supplied a want that could not be met by any system of central schools, however equipped. Wherever there were teachers with scholarship and enthusiasm, there they could establish a centre. Dr. J. A. Campbell, M.P., in seconding a vote of thanks to Mr. M'Pherson, said he believed that the introduction of some higher teaching in a school had the best effect upon the whole school. He also emphasised the importance of children being kept longer at school.

The Teacher and his Function. Mr. J. H. Yoxall, M.P., Secretary of the N.U.T., read a paper on 'The Teacher and his Function.' Mr. Yoxall argued for more freedom for the teacher, and said he thought that the more liberty the State left the teacher, the more value the School would yield the State.

Pensions and Unjust Dismissals. The following motions were at this stage unanimously adopted: 'That in the interests of the public as well as of the profession, a compulsory scheme of pensions has become a necessity'; also 'That having regard to the importance of the duties committed to teachers, to the special training and education required for their equipment, and to the responsibility attached to their office, it is necessary, for the proper performance of their functions, and for the public good, that they should be guaranteed against suffering wrong or injustice through mistaken or unjust action on the part of local educational authorities.'

Reception of Deputies. In addition to Mr. Yoxall, the N.U.T. was represented by Mr. C. H. Moore, the ex-President of the National Federation of Assistant Teachers. The Irish National Teachers' Union was represented by Mr. Simmons, the President, and Mr. Bell. All of these gentlemen were cordially received, and the President, in the name of the Educational Institute, sent to the various associations represented their hearty greetings, their warm thanks for their good wishes, and their compliments on the men they sent to represent them.

Unification of Control of Secondary and Technical Education. The second day's proceedings were opened by a paper from Professor Robertson on 'Unification of Control of Secondary and Technical Education.' The Professor contended for three leading principles: (1) That secondary education, properly understood, includes technical education; (2) That there should be only one central controlling authority, to be obtained by combining for Scotland the Science and Art Department and the Scotch Education Department; (3) That there should be one local controlling authority for all kinds of education. In commending the School Boards of the country as best suited to be the local controlling authority, he considered that alterations would be necessary, such as larger areas, but he had no hesitation in pointing to them as a likely basis. A resolution on the lines of the Professor's paper was, on the motion of Dr. Ross, unanimously adopted.

School Libraries. Mr. John G. Kerr, M.A., Allan Glen's School, Glasgow, dealt with 'School Libraries,' and his motion 'That in the opinion of this meeting School Libraries should be encouraged' was carried without discussion.

Relief of an Overburdened Curriculum. Mr. James Milligan, M.A., Garnethill High School for Girls, read a paper on 'The Relief of an Overburdened Curriculum.' Mr. Milligan defined education as 'the learning necessary to fulness of life—active, intellectual, well-balanced, and righteous life.' Bearing in mind his definition and the subjects which corresponded more or less closely with its different contents, he submitted a likely course for a week in the third year of the secondary course. He concluded by expressing the hope that the nation would yet come directly to the teachers for guidance in the training and education of its children, and contended that it must be so if education was ever to be placed on the footing which alone could enable it to discharge with efficiency its all-important function.

Continuation Schools in relation to Class Teachers. Mr. R. G. Dickson, M.A., the energetic Secretary of the Edinburgh Branch, spoke on 'Continuation Schools in relation to Class Teachers.' Mr. Dickson argued in favour of the abolition of the exemption standard, and the substitution of an age and attendance limit as the true solution of the question. He wished that parents would realise it to be their duty to send their children to the evening school immediately on leaving the day school, and not after an interval of three or four years, as is too frequently the case. He did not think that young teachers of only a few years' standing should engage in evening school work, as they would be better employed in carrying on their own studies. Three openings a week, of an hour and a half or two hours, he considered sufficient in the interests of pupils and teachers alike. In dealing with the question of salaries, he demanded adequate remuneration for those who gave up their leisure hours for the public benefit.

Dearth of Male Teachers. Dr. Dey, Chairman of the Aberdeen Committee for Queen's Students, gave an address on 'The Dearth of Male Teachers.' Dr. Dey pointed to the smallness of the number of headmasterships—the prizes in the profession—as at the root of the whole matter, and spoke of the improvement of the position of assistant masters

as being the most effective means of attracting the best material. The consideration of the different phases of the question made it doubtful whether in large schools the difference of salaries between head and assistant masters was not too great. The difficulties and the grievances existing within the profession should be made as few and as small as possible, and reasonable security of tenure and provision for old age should be established.

Status of Women Teachers. Mrs. Skea, F.E.I.S., Head Teacher, St. Paul Street School, Aberdeen, read the concluding paper, its subject being 'The Status of Women in Teaching.' In the course of her paper, Mrs. Skea stated that there were three things for which women teachers must agitate till they got them: (1) Higher training; (2) freer range; (3) better emoluments. On the ground of equal training, and on that alone, could women claim equal status with men. Given that, all the rest would follow, and seeing that 55 per cent. of the teachers of Scotland were women, there must be something wrong with the system that kept so many women of force and ability and earnestness in minor positions. She urged teachers to form a high ideal of their profession, and work to improve its position.

Votes of Thanks. Votes of thanks to the University Senatus, to the Lord Provost and Magistrates of the City of Aberdeen, and to the President, closed the Congress proceedings.

Social Functions. There were several social functions of importance in connection with the Congress. On Monday evening there was a reception by the Chairman and Governors of Aberdeen Educational Trust in their schools at King Street, with an exhibition of Cookery and Laundry Work. The Congress Dinner, at which about 150 sat down, took place on Tuesday evening. There was a Congress Breakfast, under the auspices of the Aberdeen Branch of the Scottish Assistant Teachers' Association, on Wednesday morning, and in the evening a Conversazione—Reception by Lord Provost and Magistrates—and an Assembly. Several excursions had been arranged for the Saturday with a view to giving the strangers an opportunity of seeing something of the local industries, and a golf match between strangers and natives wound up the social enjoyments, all of which passed off with great *éclat*. The Aberdeen Congress was in every respect one of the most important and successful ever held under the auspices of the Educational Institute of Scotland.

Inspectorial Changes. Several important changes, consequent upon Mr. Jolly's retirement on pension, are intimated in the staff of the Scotch Inspectorate of Schools. Mr. Andrew, Banff, goes to Govan and Dumbarton; Mr. Lobban has been appointed to Banff; and Mr. Munro Fraser, Edinburgh, succeeds Mr. Lobban in Sutherland and Caithness. The vacant Inspectorship of Schools has been conferred upon Mr. James M'Pherson Wattie, M.A. (Aber.), B.A. (Oxon), Lecturer, Church of Scotland Training College, Aberdeen. Mr. Wattie graduated M.A. at Aberdeen University in 1883 with first-class honours in Classics and Mathematics, afterwards proceeding to Oxford, where he had also a distinguished career. He was for a number of years a teacher in George Watson's College, Edinburgh, and was appointed to Aberdeen in 1894.

Leaving Certificate. Intimation has been issued that the next examination for Leaving Certificates will begin on Monday, 14th June, and that applications will be received till 1st April. There are one or two changes of some importance in the regulations. The separate examination in Lower Arithmetic will be continued for the present, but the certificate granted therein is not to be called a leaving certificate. The presentation of Pupil Teachers in Arithmetic and English of the Lower Grade will not be sanctioned, unless other pupil teachers engaged in the school are presented in some of the Higher subjects.

Scottish Episcopal Teachers' Association. The Scottish Episcopal Teachers' Association, which was formed recently, is making good progress, the membership having reached eighty, while local branches are being formed in most of the dioceses. The Episcopal Teachers have, in these days especially, interests to look after, which form a sufficient justification for a separate organisation. They do well, however, in being members, as most of them are, of the general body, the Educational Institute.

New Science and Art Regulations. The new Science and Art Regulations are causing considerable dissatisfaction, and the West of Scotland Art Teachers' Association, in a memorial to the Science and Art Department, urge a reconsideration of the new regulations for the following reasons, viz.: (1) That the method of registration is too complicated; (2) That the restrictions as to the registration of advanced students are oppressive; (3) That the most useful and successful schools would suffer by the new rules; (4) That the graduation of payments would lead to registration in unsuitable subjects; (5) That the conditions on which the highest grant would be awarded are not definitely laid down.

E.I.S. Deputation to the Secretary for Scotland. A deputation from the Educational Institute of Scotland has waited upon Lord Balfour of Burleigh, the Secretary for Scotland, in his office in Parliament Square, Edinburgh, in support of a memorial in favour of a pension scheme for teachers, and reasonable security against arbitrary dismissal. Lord Balfour was accompanied by Dr. Craik, Secretary of the Scotch Education Department. His lordship received the deputation most courteously, and though his words, as was to be expected from one in his responsible position, were carefully weighed, they were distinctly friendly. His lordship expressed his willingness to investigate cases of alleged capricious dismissal, and invited the deputation to furnish to the Department a list of such cases for the past five or ten years. Lord Balfour's sympathies are with teachers in regard to pensions, and, while not committing himself, he left the decided impression that both England and Scotland are likely to have a pension scheme as soon as Parliament can find time to deal with the matter.

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Head Master of the Belvedere Pupil Teachers' Centre, First on Scholarship List, Author of 'Scholarship School Management.'

PUPIL TEACHERS' COURSE.

I. FOR APRIL 1897.—TENTH MONTH.

WORK TO BE PREPARED.

A.—*English.*

(Students are invited to write for assistance in cases of doubt or difficulty.)

First Year.

1. Revise any weak points in Grammar.
2. Revise verses 11–20 of the 'Elegy.'

Second Year.

1. Tabulate prefixes in lines 100–150 of the 'Winter Evening.'
2. Prepare lines 333–361 of the *Task*, Book IV. Make sure of all meanings, learn all notes, explanations of allusions and derivations of chief words. Pay special attention to the paraphrasing.

Third Year.

1. Learn 20 roots and meanings each week.
2. *Julius Cæsar.*—Prepare Act V., Scene 2 to the end.

Notes:—

1. Paraphrase of the 'Elegy' (*cont.*).

If by any chance in years to come, some one, similarly given to quiet thought and contemplation, shall enquire as to the fate of the author, who in these lines commemorates in simple manner the forgotten dead, he may be answered by some grey-headed old labourer in some such words as these:—'We often used to see him at the earliest dawn walking over the dewy grass towards the uplands as if to meet the rising sun, or at midday he would be lying under the shade of that old and twisted beech, gazing dreamily on the babbling brook that passes by, or again he might be seen wandering by the wood, sometimes smiling and talking to himself, and sometimes looking so dispirited and hopeless that one might think him the victim of some devouring passion or the prey of some overwhelming care. One day I did not see him in either of his accustomed haunts, and shortly afterwards we saw him carried to his last resting-place in the old churchyard, to the solemn strains of funeral hymns. If you go over to that old thorn you may see his grave and read the words on the stone over him.' Epitaph:—In this quiet spot lies one who was unknown to fame and fortune, and who, though born to a life of knowledge, was nevertheless doomed to a life of sadness. He was endowed with a kindness of heart and purity of soul which enabled him to appreciate and sympathise with the misfortunes of others, though he was often unable to give more than a tear. Nothing more need be said of him either in praise or blame than that he rests in hope of a future life with his God.

2. General paraphrase of the 'Winter Evening' (lines 120–192).

I love winter, although, perhaps, there is at first sight little to admire in it, and by some it may even be dreaded. I picture him seated in a sledge for his throne, and holding for his sceptre a leafless branch. His rough hair is filled with powdered sleet, his breath is frozen upon his lips, his cheeks are bordered by a beard white with frost and snow rather than with age, and his forehead wrapped in lowering clouds. He delays the rising of the sun in the darkened east, and hurries him down in the rosy west as if impatient of his longer stay, but compensating us for the shortness of the day by increasing the length of the evening with its pleasant and instructive talk, and by gathering together the family which has been scattered during the preceding seasons. Winter is the king of house life, bright and happy evenings by the fireside, and of all those innocent pleasures that accrue to the lowly house by the reunion of members of the family and the long hours of evening.

No powdered and impertinent footman so thunders by long practice at our door that the whole street resounds; no horses stand in the bitterly cold air, and by their coughs indicate their early deaths from thoughtless exposure, while their owners, with nothing to talk about, sit in a freezing room and affectedly fan themselves in the pretence that they are warm.

How different is the manner in which we spend our evenings. The ladies are busily engaged in needlework, and under their assiduous care the pattern on the snowy muslin gradually develops the blossoms, buds, leaves, sprigs, and twining stems, the whole forming a beautiful group of flowers that do not decay and fade, whose bloom grows fastest when the originals are dead. Or, one of us may read aloud the works of some poet or historian, to the improvement and pleasure of himself and the others, or we indulge in the sweet strains of music, either the harp by itself or in pleasing contest with a charming voice. By these means the simple tasks are performed more easily and pleasantly, and the time passes rapidly. The evening is closed with the ceremonies of the last meal of the day, a simple repast such as the early Romans, though masters of the world, enjoyed when, sitting in the moonlight at their doors or under the shelter of some spreading tree, they supped abstemiously on a radish and an egg. The supper finished, some time is passed before retiring in talk which is neither dull nor trivial, and from which neither wit nor laughter is banished as something vulgar. Neither are we like the unreligious world, afraid to talk of God and His mercies. We are not ashamed to mention His name or sing His praises when with gratitude and love we think on our past life, and by the aid of memory retrace the dangers from which we have escaped, the temptations we have overcome to the discomfiture of our foe; how by the divine and eternal love of the Omnipotent we have found deliverance when least expected, and our lives have been preserved in peace and happiness. Horace may be enraptured with his 'evenings worthy of the gods,' but surely ours are more enjoyable and precious than his, because they are illumined with greater and nobler truths than he had an opportunity of knowing and appreciating.

3. Selected lines from *Julius Cæsar.*

Act I., Scene 2, line 135.

Cæsar towers aloft and dominates us all like some huge Colossus, while we, small and insignificant by comparison, seem solely concerned as to how we can with most dishonour quit this life. A man's career depends upon his own exertions, and it is his own fault, and not that of the stars, that he is a cringing and subservient slave.

Line 162.

I am not in the least doubtful of your love and regard to me, Cassius, and I have some idea of what you would persuade me to, and I will on some future occasion give you my opinion of current events; but just at present, if you will be so good, I would rather hear nothing more. I will think over what you have said, and I will find an opportunity to hear anything further you may have to say to me, and to discuss these topics. Till then you may find some consolation when I say that I would rather give up all my privileges of rank and wealth and be some ignorant countryman than I would live in Rome under the humiliating conditions which probably may be imposed on us.

Line 200. Cæsar's estimate of Cassius.

If fear were a part of my nature, I do not know anyone whom I should fear more than you Cassius. He is a deep reader and a close observer, and he penetrates through men's actions to the motives underlying them. He does not frequent the theatre, and hears no music. He rarely smiles, and when he does it is in such a disdainful manner, as though he despised himself for being so weak as to be sufficiently moved to smile at anything. Such men as he are never contented so long as they see anyone in a higher position than themselves, and on that account they are to be watched and avoided.

Line 305.

Brutus has undoubtedly a noble nature, but yet I see that his mind, though full of honour, can be directed into a totally different channel from what it would naturally follow, and he is an example of the truth that it would be well for all such men who are the soul of honour and cannot understand any underhanded practice to consort only with others of similar character. Cæsar is most suspicious of me, but he is extremely fond of Brutus. If I occupied Brutus's place in Cæsar's affections, I would not let anyone seduce me from my allegiance to him.

B.—*Arithmetic.*

First Year.

Boys.—Lock. Chapter VIII., and examples.
Girls.—Dixon and Beach. Ex. XXXVI.

Second Year.

Boys.—Lock. Ex. CXXXIII.
Girls.—Dixon and Beach. Ex. XXIV.

Third Year.

Boys.—Work any back papers.
Girls.—Dixon and Beach. Ex. XXX.

C.—*Music.*

Work any back questions.

D.—*Spelling.*

Fifty words per week from 'Words Commonly Misspelt,' or any good list.

E.—*Geography.*

Australia.—Industries, imports, exports, colonies and towns, etc.

F.—*History.*

Revise the reign of William and Mary and of Anne.

(N.B.—Next month a complete set of Geography and History revision questions will be given.)

G.—*Euclid.*

Second Year.—Revise Book I., Propositions 1–12.
Third Year.—Revise Book I., Propositions 20–30.

H.—*Algebra.*

Third Year.—'Scholarship Algebra,' Chapter XXII.

I.—*Teaching.*

Second Year.—'Scholarship School Management.' Revise the Teaching of Reading.

Third Year.—'Scholarship School Management.' Revise Chapters II. and III.

QUARTERLY TEST EXAMINATION.

The following papers should be worked under strict examination rules.

If desired, the papers can be corrected, criticised, and returned if sent to me with a postal order for 1s. 6d. Answers should be written on foolscap, on *one* side only.

ALL YEARS.

1. *Penmanship.—Time* 15 *minutes.—Marks* 40.

(*a*) Write as specimens of Large-hand:—
Libellulidæ.
(*b*) Small-hand:—
Increase of power begets increase of wealth.

2. *Geography.—Time* 1 *hour.—Marks* 80.

Three questions to be answered, including the first.

1. Draw a map of North America, showing rivers, lakes, and mountains only; *or* draw a map of the United States, showing physical features and these towns *only*:—New York, Philadelphia, San Francisco, New Orleans, St. Louis, Chicago, and Washington.

2. Say what you can of the English possessions in South Africa under these heads: (*a*) Names of various colonies; (*b*) productions; (*c*) chief towns; (*d*) peoples.

3. Describe, with a sketch map, the basins of (*a*) the St. Lawrence, or (*b*) the Mississippi, or (*c*) the Amazon.

4. Give some account (four or five lines) of four of the following: The Nile—Madagascar—Tasmania—Greenland—Alaska—Jamaica—British Guiana—Patagonia.

5. Where and what are eight of the following (not more than three lines about each): Buluwayo—Falkland Islands—Winnipeg—Coolgardie—Damietta—Fez—Zanzibar—Pernambuco—National Park—Havanna—Potosi—Quito?

6. Enumerate the native races under British rule in Africa and America, and give a short account of one of them.

3. *History.—Time* 1 *hour.—Marks* 80.

Three questions to be answered, including the first, if possible.

1. Name the sovereigns of the House of Brunswick, with the dates of their accession. Trace their descent from the last reigning dynasty, and state on what their right to the throne is founded.

2. Name, with dates, the chief events of the latter half of the eighteenth century.

3. What great changes have been made in the representation of the people in Parliament during the present century?

4. Write a short account of the Seven Years' War, and recite the principal terms of the Treaty of Paris.

5. When were the legislative unions of Scotland and of Ireland with England effected? What circumstances led to these unions, and how were they accomplished?

6. What events led to the Battle of Waterloo? Describe it.

First Year.

Arithmetic.—Time 1 *hour.—Marks* 100.

Three questions to be answered, including the first, if possible.

(*Girls.*)—

1. (*a*) Prove that seven times nine = nine times seven.

(*b*) In finding the L.C.M. of 10, 15, 30, 32, 36, why can we neglect 10 and 15?

(*c*) Prove, as to a class of children, that $\frac{A}{B} + \frac{3}{8} = \frac{3A}{8B}$.

(*d*) Define Submultiple, Measure, Multiple, Factor, and Greatest Common Measure.

2. On a rock are three revolving lights; one revolves in 2 min. 12 sec., another in 3 min. 7 sec., the third in 3 min. 24 sec. They are all visible at midnight. When will they next be so?

3. Find by Practice the value of 6·15 tons 3 cwt. 1 qr. 20 lbs. 9 oz. at £75 12s. per cwt.

4. Make out the following bill (deducting 5 per cent. for ready money, if you can):

307 dozens of buttons	at 2½d. per dozen.
17 pieces of tape	at 3 for 2½d.
180 reels of cotton	at 9d. per score.
89 yards of ribbon	at 3½d. per yard.
71 yards of cloth	at 1s. 1½d. per yard.

(*Boys.*)—

1. (As in Girls').

2. Find the difference between $\frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{2} + \frac{1}{3}}$ of 19s. 10d. and $\frac{3\frac{1}{4} + 2\frac{1}{8}}{3\frac{1}{4} - 2\frac{1}{8}}$ of 1½d., and reduce the difference to the fraction of 4s. 5½d.

3. Express as decimal of a pound $\frac{3}{8}$ of 5½ of 3s. 9d., and find the value of that decimal of a yard.

4. What decimal of one pound multiplied by $3\frac{1}{8}$ is equal to £1 7s.?

English.—Time 1 *hour.—Marks* 80.

Answer three questions, including the first.

1. Analyse the following, and parse the words in italics:—

> *For* who to dumb forgetfulness *a prey*,
> This pleasing anxious *being e'er* resigned,
> *Left* the warm precincts of the cheerful day,
> *Nor cast* one longing, lingering look behind?
> On *some* fond breast the parting soul relies,
> Some pious drops the closing eye requires.

2. Give the meanings of the suffixes in the following words, and give two instances of others similarly formed:—*echoing, fecund, grandeur, disdainful, inevitable, mansion, inglorious, children, moralist, length.*

3. How would you classify sentences? Give examples of each kind from the poem you have studied.

4. Write brief explanations of the following:—Dirges—uncouth rhymes—incense kindled at the Muse's flame—mute inglorious Milton—rod of empire—fretted vault.

5. Write a short life of Gray, and mention any other poems of his which you have read.

Music.—Time 15 *minutes.—Marks* 15.

Answer all questions.

1. State between which tones of the common scale there are (*a*) minor sixths, (*b*) minor thirds.

2. Write the following in two-pulse measure an octave higher, halving the value of each note:—

m	:	—	| —	:	—	r	:	—	| f	:	—
l_1	:	—	| t_1	:	—		:		| d	:	—

3. What other four contiguous tones of the scale are separated by the same steps as **r m f s**?

Second Year.

Arithmetic—Time 1 *hour.—Marks* 100.

Answer three questions, including the first, if you can.

(*Boys.*—

1. Explain fully as to a class the meaning of the terms Principal, Rate per cent., and Amount as applied to simple interest.

What sum must be lent at simple interest, at 2½ per cent. per half year, to amount in four years to £2,360?

2. A house costs £750, and the ground rent is £20 a year. At how much a year must it be let to pay 5 per cent., after allowing 4 per cent. annually for repairs?

3. How much must a person invest in the 2¾ per cent. stock at 98¼ in order that he may have a yearly income of £233, after paying an income tax of 7d. in the £?

4. A grocer mixes 16 lbs. of tea at 2s. 8d. per lb. with 28 lbs. at 2s. 6d. per lb. and 11 lbs. at 2s. 4d. per lb. What does he gain per cent. if he sells the mixture at 2s. 9d. per lb.?

(*Girls.*—

1. What is meant by a decimal fraction? Explain the method of reducing a vulgar fraction to a decimal, taking as examples $\frac{68}{425}$ and $\frac{19}{13}$.

2. From $11\frac{3}{8}\left(\frac{2\frac{1}{2}}{7} + \frac{4}{9} \text{ of } \frac{36}{40}\right)$ take $11\frac{3}{8}$ of $\frac{2\frac{1}{2}}{7} + \frac{4}{9}$ of $\frac{36}{40}$.

3. Express the sum of $\frac{7}{50}$ of $2\frac{1}{14}$ of a mile + $\frac{13}{100}$ of $1\frac{1}{2}$ of $1\frac{1}{22}$ of a furlong as a fraction of 13 yards.

4. A train consists of engine, tender, and 8 carriages. The weight of the engine and tender equals $\frac{5}{23}$ of the total weight of the train, and is 72 tons less than the weight of the carriages. Find the weight of a carriage.

English.—Time 1 *hour.—Marks* 80.

Answer three questions, including the first.

1. Paraphrase—

> Come, Evening, *once again*, season of peace;
> Return, sweet Evening, and continue long;
> *Methinks* I see thee in the streaky west
> With matron step slow moving, while the Night
> Treads on thy sweeping train; one hand employed
> *In letting fall* the curtain of repose
> On man and beast; the other charged for man
> With sweet oblivion of the cares of day:
> Not sumptuously adorned, not needing aid,
> *Like* homely-featured *Night*, of clustering gems!
> A star or two, just twinkling on thy brow,
> Suffices thee: save that the moon is thine
> No less than *hers*, not worn indeed *on high*
> With ostentatious pageantry, but set
> With modest grandeur on thy purple zone.

2. Analyse the first eight lines and parse the words in italics.

3. Write a life of Cowper and mention any other of his works which you know.

4. Give the derivation of the following:—Symphonious, omnipotent, dialogue, quadrangular, destructive, excursive, multiplied, mercurial, superstition, prophesying.

5. Write notes on the following:—Olympian dews—the inverted year—powdered pert—a Roman meal—the Sabine bard—the backstring—the mood lethargic—the weedy fallows.

6. Explain what is meant by subordinate sentences, and give three examples of each from the poem you have studied.

Teaching.—Time 40 *minutes.—Marks* 40.

Answer two questions.

1. What use would you make of Mental Arithmetic in a first lesson on Multiplication, or on Single Rule of Three by the method of unity?

2. What points have to be considered in selecting suitable poetry for recitation? Name three pieces suitable for the Second and Fourth Standards.

3. What are the chief aims to be borne in mind in giving a lesson on Word-building?

Music.—Time 15 *minutes.—Marks* 15.

Answer all questions.

1. Re-write the following, making a change by a bridge note to the first sharp key at (*a*) and a return to the original at (*b*).

						(*a*)								(*b*)		
m	f	r	d	s	fe	l	m	fe	l	r	fe	s	f	m	r	d

2. Name the following intervals:—*Ray—Doh*', *Lah—Soh*', *Soh—Ray*', *Te—La*.

3. Write out the following passage in four pulse measure. The figures show duration in pulses or fractions of a pulse. Begin on a strong pulse.

1	¾	¼	1½	½	¾	¼	¾	¼	½	½	1
d	m	f	s	REST	s	f	m	REST	REST	r	d

Third Year.

Arithmetic.—Time 1 *hour.—Marks* 100.

Answer three questions, including the first.

(*Boys.*)—

1. Establish a general method or rule for reducing a circulating decimal to a vulgar fraction.

Simplify $\left(\frac{4\cdot\dot{6}}{7\dot{6}} \times \frac{19\dot{7}\dot{2}}{9\cdot\dot{3}}\right) - \left(\frac{3\cdot\dot{5}}{4\cdot\dot{1}\dot{6}} \div \frac{2\frac{1}{13}}{3\frac{1}{3}}\right)$.

2. At what rate per cent. simple interest will £335 amount to £435 10s. in four years?

3. An observer noticed that a train passed him in 7 seconds, and that it passed through the station, which was 396 yards long, in 25 seconds. How long was the train and how was fast it moving?

4. A man insured his life for £3,500 at a yearly premium of £65. He died immediately after making the fourth annual payment. How much did the company lose by the transaction if money was then worth 5 per cent. compound interest?

(*Girls.*)—

1. What is your method of dividing one decimal by another? Take as an example 8·046 divided by 14·9.

Simplify $\frac{\cdot285 \times \cdot002 \times 1\cdot8}{\cdot009 \times \cdot038}$.

2. Reduce £·64375 + ·025 of £1 5s. to the decimal of ·675 of £2.

3. After paying 7d. in the £ income tax a person has £625 18s. 10¾d. What was his gross income?

4. Equal quantities of tea which cost 2s. and 1s. 8d. per lb. respectively are mixed and sold for 2s. 2d. per lb. at a total profit of £3. How many lbs. were sold?

Euclid.—Time 40 *minutes.—Marks* 50.

Answer two questions.

1. Define a point, a figure, an acute-angled triangle.

From a given point, to draw a straight line equal to a given straight line.

2. If one side of a triangle be produced, the exterior angle shall be greater than either of the interior opposite angles.

Any two exterior angles of a triangle are together greater than two right angles.

3. Find a point equally distant from three given points.

English.—Time 1 *hour.—Marks* 80.

Answer three questions, including the first.

1. Paraphrase—

> Crown him?—that.
> And then I grant we put a sting in him
> That at his will he may do danger with.
> The abuse of greatness is, when it disjoins
> Remorse from power; and, to speak truth of Cæsar,
> I have not known when his affection swayed
> More than his reason. But 'tis a common proof
> That lowliness is young ambition's ladder,
> Whereto the climber upward turns his face;
> But when he once attains the upmost round,
> He then unto the ladder turns his back,
> Looks in the clouds, *scorning* the base degrees
> By which he did ascend. So Cæsar *may*.
> Then, *lest* he may, *prevent*.

2. Analyse from 'But 'tis a common proof' to the end, and parse words in italics.

3. Explain the following :—Cæsar's trophies—Erebus—crimsoned in thy Lethe—they rob the Hybla bees—I held Epicurus strong—like a Colossus—dearer than Pluto's mind.

4. Write a character of Brutus or Cassius.

5. Quote 8 or 10 lines of passages from the play which are particularly well known.

6. Give in your own words the arguments by which Cassius induced Brutus to join the conspiracy.

Euclid.—Time 40 *minutes.—Marks* 50.

Answer two questions.

1. Define parallel straight lines, and prove I. 27.

2. Define a parallelogram, and prove I. 42.

3. Two triangles of equal area stand on the same base but on opposite sides of it, show that the straight line joining their vertices is bisected by the base or by the base produced.

Algebra.—Time 40 *minutes.—Marks* 50.

Answer three questions.

1. The product of two algebraical expressions is $a^7 - 64a$, and one of the expressions is $a^4 - 2a + 4$. What is the other?

2. Find the G.C.M. of $102(a^4y + 9ay - 2y)$ and $119(5a^3x + 9x^2 - 64x)$.

3. Simplify $\frac{1}{p-3} + \frac{1}{p+3} - \frac{6}{p^2-9}$.

4. What axioms are frequently used in the solution of equations?

Solve—

(1) $\frac{3x-1}{11} - \frac{2(x-1)}{5} = \frac{2-x}{10}$.

(2) $\frac{5(x-2)}{x+2} - \frac{2(x-3)}{x+3} = 3$.

Teaching.—Time 40 *minutes.—Marks* 40.

Answer Question 1 and one other.

1. Write notes of a lesson on one of the following :—
   (*a*) The Alps.
   (*b*) Adjective Sentences.
   (*c*) A Candle.

2. What are the class subjects mentioned in the Code? How far should they be taught from text-books and how far orally?

3. What are the best means of rousing and sustaining the attention of a class inclined to be disorderly?

Music.—Time 20 *minutes.—Marks* 15.

1. Write a minor 7th above each of the following :—*Doh, fah, me, lah.*

2. State the meaning of the following terms :—*Adagio, Legato, Rallentando, Dal Segno, Ad libitum, Crescendo.*

3. Re-write the following in four-pulse measure, doubling the value of every note and rest :—

| m :-.f,m | r. : .l,s | f., t_1 :d ‖

To encourage the students who follow this course, we have pleasure in offering a **Prize of One Guinea** for the best set of papers submitted. Competitors must send a certificate from Head Teacher that tests have been worked under Exam. conditions. Papers should be sent direct to Mr. Flux not later than Feb 10. —Ed.

OCTOBER EXAMINATION, 1897.

Fifth Month.

Work to be prepared.

(N.B.—Write for assistance in any difficulty.)

A.—*English.*

First Year.

1. The Adjective. Learn a good classification, with definitions.

Note the Comparison and various methods of forming Comparative and Superlative Degrees, and the adjectives of irregular comparison.

2. Learn one-half of the Latin noun suffixes.

3. Prepare verses 17–20 of Gray's 'Elegy in a Country Churchyard.' Learn the meanings of all allusions, references, and derivations.

Second Year.

1. The Verb : Voice, Mood, Tense, Number, and Person.
   Note Transitive verbs only have voice. There are three finite moods : Indicative, Subjunctive (which carefully note), and Imperative, and one Infinitive Mood.
   Three Tenses—Present, Past, and Future, Perfect and Imperfect.

2. The Anglo-Saxon Noun Prefixes, with examples.

3. Prepare lines 150–193 of the 'Winter Evening' (*Task*, Book IV.). Make sure of meanings, learn all notes, explanations of allusions, derivation of chief words. Be particularly careful with the paraphrasing.

Third Year.

1. Finish the Latin Suffixes, with meanings and examples.

2. *Julius Cæsar.*—Prepare thoroughly from the assassination to the end of Act III., Scene 1. Note carefully the speeches of Brutus and Antony. Study the meaning carefully, be prepared to paraphrase and analyse any part and to parse any word.

Notes on the 'Winter Evening.'

Line 153.—*Buds, leaves, sprigs, tendrils.* Nominative to 'follow.'
,, 156.—*Wreath.* Nom. in Apposition to above.
,, 159.—*Vocal.* Adjective, forming completion of 'made.'
,, 158.—*Page.* Nom. to 'beguile' (164). So also *lyre* (160), *voice* (161), *volume.*
,, 167.—*Volume.* Nominative absolute. *Closed*—participle, qual.
,, 168.—*Meal.* There is no verb to this noun. It is called in such case *Nominativus Pendens.*
,, 169.—*Such.* Adj. qual. *meal.*
as. Relative Pron. Obj. Case. gov. by *found.*
,, 170.—*Delicious.* Adj. qual. *as.*
,, 178.—Note the double objects after *deem*, viz. *religion frenzy, God and intruder, praise*, and *note.*
,, 181.—Supply *We discuss* themes, &c.
,, 185.—*Dangers, snare* (185), *foe, deliverance* (186), *life, peace* (187), *Fruits* (188), all Objective Case gov. by *retrace.*
,, 191.—*Yours.* Nom. case to *were*, understood.
,, 191 & 192.—Enlargement of *evenings.*

B.—*Arithmetic.*

First Year.

Boys.—Lock. Work Example LV. Nos. 21–50, and Example LVI.

Girls.—Dixon and Beach. Read Chapter XI., and work Examples.

Second Year.

Boys.—Lock. Work the whole Example CXIV. (a very common type of sum).

Girls.—Dixon and Beach. Read Chapters XVI. and XVII. and work the Exercises (Addition, Subtraction, and Multiplication of Decimals).

Third Year.

Boys.—Lock. Work Examples for Exercise Nos. 748–775.

Girls.—Dixon and Beach. Chapter XXIX. and Examples.

C.—*Music.*

First Year.—Two-, three-, and four-pulse measures.

Second Year.—Thirds of a pulse.

Third Year.—One-fourth of the musical terms in common use.

D.—*Spelling.*

Learn 50 words per week from 'Words Commonly Misspelt,' or any good list, and test by Dictation.

E.—*Geography.*

North America.—Physical Features, Climate, and Productions.

This work involves the retention of a great number of new names. The only way to fix them in the memory is to draw a map, insert all places to be remembered, and go over them continually till they and their positions are thoroughly known.

F.—*History.*

George III., 1760–1793.

Chief points :—

(*a*) The close of the Seven Years' War, and the Treaty of Paris, which not only secured our supremacy in India, but also made over to us the whole of Canada.
(*b*) The affair of John Wilkes. Note that his popularity was not due to his personal character, but because he was fighting for freedom of the press.
(*c*) The war with the American Colonies. This must be most carefully studied, as it is of great importance.
(*d*) The Treaty of Versailles.
(*e*) The Gordon Riots.
(*f*) Pitt's Administration, and the progress of the French Revolution up to 1793.

G.—*Euclid.*

Second Year.—Book I., Propositions 11–15, and four deductions per week.

Third Year.—Book I., Propositions 39–42, and four deductions per week.

H.—*Algebra.*

Third Year.—Read carefully Chaps. X. and XI., and work the Exercises given. These factors are of the greatest importance, and must be thoroughly mastered.

I.—*Teaching.*

Second Year.—'Scholarship School Management.' Chapter IV. The Teaching of Reading.

Third Year.—'Scholarship School Management.' Chapter XII. Elementary Science, Drawing, and Singing.

QUESTIONS TO BE ANSWERED.

1. *Penmanship.*—Write as specimens of—
   (*a*) Large-hand: Jurisprudence, Kleptomania, Lycurgus, Metonymy.
   (*b*) Small-hand: There is not in the wide world a valley so sweet. (A subject requiring very great and continual attention.)

2. Write an essay each week, selecting from:—Friendship, Decision of Character, The Fox and the Grapes, Humility, Kind Words, Empty barrels make the most sound.

3. Notes of Lessons. (A criticism lesson to be given each week.) Fishes, Multiplication of Money, Rain and its uses, A Sparrow, Classes of Birds, The Diving Bell, Gunpowder Plot, Rice.

4. *First Year.*
   (1) Analyse verse 13 and parse *rich, did unroll, their, rage, penury.*
   (2) Analyse verse 15 and parse, line 57, *may rest, guiltless.*
   (3) Analyse verses 16 and 17 and parse *to command, ruin, plenty, alone, crimes confined.*
   (4) Analyse verse 19 and parse lines 73 and 74.
   (5) Give the meaning of the suffixes in the following words—*knowledge, penury, genial, purest, sweetness, inglorious, mankind.*
   (6) Explain:—*fretted vault—rod of empire—chill penury—some village Hampden—the madding crowd—the Muse's flame.*

Second Year.
   (1) Paraphrase lines 120–129, 139–149, 158–166, 174–188.
   (2) Analyse lines 128–135, 151–157, 167–176, 189–193.
   (3) Parse *like ashes* (121), *white* (123), *than* (124), *all unlovely as* (128), *thee King* (139), *of sounding an alarm* (146), *a wreath* (156), *when all besides* (157), *made vocal* (159), *volume closed* (167), *such as* (169), *delicious* (170), *share feast* (173), *religion, frenzy* (178), *evening* (189), *evenings* (190), *as more* (192), *mine* (193).
   (4) Give the derivation (prefixes and roots of):—*inverted, congealed, impatient, compensating, instructive, dispersed, retirement, symphonious, prescribes, exerting, omnipotent, illumined.*

Third Year.
   (1) Paraphrase:—
      (*a*) Act 3, Scene 1.
         Cæsar: I must prevent thee, Cimber . . .
         . . . will he be satisfied.
      (*b*) Act 3, Scene 7.
         Cæsar: I could well be moved . . .
         . . . to keep him so.
      (*c*) Act 3, Scene 1.
         Antony: I know not, gentlemen . . .
         . . . master spirits of this age.
      (*d*) Act 3, Scene 1.
         Antony: O pardon me . . .
         . . . parts of Italy.
   (2) Analyse the same passages.
   (3) Parse:—
      (*a*) So oft as that shall be,
         So often shall the knot of us be called
         The men that gave their country liberty.
      (*b*) Your voice shall be as strong as any man's
         In the disposing of new dignities.

5. Say what you can of the Transvaal and its people.

6. Make a list of the British possessions in Africa (excluding Cape Colony and Natal), and give an account of one of them.

7. What was the South Sea Bubble? Explain clearly the cause of the distress.

8. How was the foundation of our Empire in India laid?

NEW SCHOLARSHIP COURSE.

2ND MONTH—FEBRUARY 1898.

1. *Reading.* } Ten minutes' practice daily.
2. *Writing.* }

3. *Spelling.*—50 words per week from 'Words Commonly Misspelt.'

4. *Composition.*—Write one or two essays each week, selecting from the following:—
   Colonisation—Birds and their nests—Education—Money, its uses and abuses—Nansen and his work—Advantages of travelling.

5. *English.*—
   (*a*) The Adjective, fully.
   (*b*) 25 Roots and meanings per week.
   (*c*) Literature. Meiklejohn, Chapter II. (Mandeville, Wyclif, Gower, Langlande, Chaucer, and Barbour.)

6. *Arithmetic.*—Vulgar Fractions.
   Girls.—Algebra. Blackie's Elementary, Chapter II.

7. *Algebra.*—Hall & Knight, Exercises X*a*. to XIII*a*.

8. *Euclid.*—Book I. Props. 6–18. Egan's Exercises, 20 to 40.

9. *Geography.*
   (*a*) Revise Russia, Austria, and Switzerland.
   (*b*) India.

Notes on the Indian Empire.

Prepare from your text-book, Area, Boundaries, Physical Features, Climate, Productions, Peoples, Government, Provinces, and Towns. Draw a map and insert all names to be remembered. It will be a good plan to take a slate and scratch on it the outline, rivers, and mountains, then practise inserting names, etc., till thoroughly known. The following facts may be found useful:—

1. India is not one country with one people, but a vast collection of states and races. Every variety of climate and production is found, from the torrid lowlands to the eternal snows of the Himalayas. The area in round numbers is 1,506,000 square miles, or including Burmah, 1,795,000 square miles, two-fifths of which is under native rulers. The area is 15 times that of the British Isles.

2. *Coast line.*—Note the Runn of Cutch, Diu I., Bombay and Salsette Is., the Lakkadhives (Lakkai divipu = 100,000 islands), the Malabar Coast, Adam's Bridge (a peculiar bar of rock), Coromandel Coast, Orissa Coast, the low-lying Sunderbunds.

3. *Relief.*—The triangular Deccan, the Plains of the Indus and Ganges, the Great Desert.

4. *Climate.*—Varies largely with district and elevation. Note the monsoons—periodic winds; the N.E. monsoon from October to April, and the S.W. monsoon, the rain bringer, from May to September. The months of May and June are intensely hot, the country becomes parched, and the breaking of the monsoon is eagerly awaited. The rainfall on the Cherra Poongee Hills, at the foot of the Himalayas, exposed to the S.W. wind from the Bay of Bengal is enormous, over 650 inches per annum. To avoid the excessive heat of summer Europeans repair to *Sanatoria*, or health resorts, the chief being—
   Simla, Mussoorie, Darjeeling, in the Himalayas.
   Shillong, on the hills of Assam.
   Pachmari, in the Central Provinces.
   Abu, in Rajputana.
   Matheran and Mahabaleswar, in Bombay.
   Ootacamund, on the Neilgheries.

5. *Productions.*
   Vegetable.—*Trees.*—Tal, sal, teak, gum arabic, sandal-wood, banyan, tamarind, mango, ironwood, ebony, satinwood, deodar, indiarubber, etc.
   Fruits.—Mango, banana, lime, guava, custard-apple, water-melon, gourds, pine apple, peach, grape, apricot.
   Crop Plants.—Wheat, barley, rice, maize, sorghum, millet. *Seeds*, as mustard, rape, linseed, castor oil, cocoa nut. *Fibrous plants*, as cotton, jute, cocoa nut (for coir). *Dyes*, indigo, madder, arnatto. *Condiments*, chillies, ginger, turmeric, cinnamon.
   Others.—Sugar cane, arrowroot, tobacco, tea, coffee, hemp, opium-poppy, betel, pepper, areca nut.
   Animals, birds, insects, etc.

6. *Peoples*—may be divided into five classes—
   (*a*) The dark aboriginal natives; *e.g.*, Kolarian and Dravidian races.
   (*b*) Lighter-tinted, descendants of Aryan and Scythian immigrants in N.W. Punjab, Sind, etc.
   (*c*) Mixtures of the two in all proportions.
   (*d*) Immigrants from coasts, Parsees from Persia, Portuguese from Goa, Jews from Cochin, Arabs of Malabar, English, and other Europeans.
   (*e*) Eurasians—mixed descendants of Europeans and natives.
   There are about 70 languages and dialects spoken, which come under three heads; (*a*) those based on colloquial Sanskrit; (*b*) Tamil, and the modern languages of Southern India; and (*c*) Indo-Chinese of Burmah.

7. *Population.* Amounts now to close on 300,000,000.

8. *Religions.*
   Buddhism—the worship of Buddha (*see* Edward Arnold's 'Light of Asia').
   Brahmanism—a spurious Buddhism.
   Mahommedanism—introduced by the warlike invaders of the north.
   Christians, Jains, Sikhs, Parsees, and Jews.
   Note the four *castes* or social classes.

9. *Government.*—India is *not* a colony, but a dependency.
   (*a*) *Supreme Government*—Viceroy and Executive Council of Six, with others to aid in legislation. Present Viceroy: Earl of Elgin and Kincardine.
   India is represented in England by the Secretary of State for India, Lord George Hamilton, and a separate office from the Colonial.
   (*b*) *Provincial Governments* (13).

(1) Madras.	Title of ruler, Governor.		
(2) Bombay.	,,	,,	,,
(3) Bengal.	,,	,,	Lieutenant-Governor.
(4) N.W. Provinces with Oudh.	,,	,,	,,
(5) Punjab.	,,	,,	,,
(6) Burmah.	,,	,,	Chief Commissioner.
(7) Assam.	,,	,,	,,
(8) Central Provinces.	,,	,,	,,
(9) Berar.	,,	,,	,,
(10) Ajmere Merwara.	,,	,,	,,
(11) Coorg.	,,	,,	,,
(12) British Baluchistan.	,,	,,	,,
(13) Andaman Is.	,,	,,	,,

   Each Government is divided into districts, of which there are 246, under a Collector-Magistrate or Deputy Commissioner.
   (*c*) *Native States*, about two-fifths of the whole, varying from one square mile to countries larger than England. All are feudatory, the native ruler being assisted and advised by officers of the British Government, termed Residents or Political Agents.

Chief States :—*Baroda, Hyderabad, Mysore, Bhopal, Gwalior, Indore Cashmer, Kelat, Bekanir, Jaypore, Jodhpur*, etc.

Exports (for the last year in order of value).—Seeds, rice, jute, opium, cotton, tea, cotton yarns, hides and skins, indigo, wheat, coffee, wool, lac, oil, pulse, silk, tea, sugar, and spices.

Imports.—Cotton goods, metals, sugar, machinery, oils, provisions, railway plant, woollens, coal, liquors, apparel, hardware and cutlery, silk, salt, etc.

10. *History.*

HENRY II. TO HENRY III.

Chief points :—

Henry II.—Claim to the throne.
Foreign possessions.
Dispute with Church.
Legal Reforms.
Conquest of Ireland.
Rebellion of sons.

Richard.—The Crusades.
The government during Richard's absence.

John.—The war with France.
Dispute with Rome.
Home government and events leading up to Magna Charta.
Magna Charta and its provisions.
The subsequent civil war.

Learn the following note :—

Henry II.'s Legal Reforms.

1164.—*Constitutions of Clarendon.*
(*a*) No tenant *in capite* to be excommunicated save by the king's leave.
(*b*) No bishop to leave the realm but by the king's permission.
(*c*) Bishops to do homage to the king for their lands.
(*d*) Clerical offenders against the civil laws to be tried or punished by civil law.
(*e*) No villein's son to be admitted to orders without the consent of his lord.

1170.—*Inquest of Sheriffs.*
The office of sheriff transferred from the feudal nobility to officers of the King's Court—a blow at the Baronial power.

1166.—*Assize of Clarendon* revived Frankpledge and established the Grand Jury.

1176.—*Assize of Northampton.*
Division of England into 6 circuits, each with 3 justices.
Oath of fealty exacted from all classes.

1181.—*Assize of Arms.*
Every freeman to bear arms according to his position—a revival of the ancient 'fyrd' or Anglo-Saxon Militia.

Henry III.—The minority. England under Hubert de Burgh and Peter des Roches.
Mad Parliament and Provisions of Oxford.
Mise of Amiens, 1264.
The Civil War, battle of Lewes.
De Montfort's Parliament.
Battle of Evesham and Dictum of Kenilworth.

Notes.—Montfort's Parliament—After the Conquest the Great Council consisted of *all* the tenants in chief, but of these the smaller and poorer soon ceased to attend or to be expected to attend, and thus two classes arose—the Greater Barons and the Lesser Barons. This is evident in John's promise 'to summon separately *by letter* all who hold of us in chief, and generally, by the sheriffs, the lesser barons. On several occasions the lesser barons, instead of all attending, selected two or four of their numbers to attend in their place. When Montfort directed the return of two knights of the shire he was therefore not making any innovation, but simply acting as had been done previously. This was the beginning of county representation.

His real innovation was the summoning of *two burgesses* from the large towns, thus introducing a new class into the Parliament. The national assembly did not sit as two separate houses till many years after this. The towns who sent members were never definitely settled, the numbers varying from 100 to 260.

11. *Teaching.*—'Scholarship School Management,' Chapter II.

12. *Domestic Economy.*—Classification of Foods. Carbonaceous and Nitrogenous Compounds.

13. *Music.*—'School Music Teacher,' Chapter II.

14. *French.*
The Noun. Plurals, etc.
La Grammaire, next 3 pages.

TEST QUESTIONS.

1. Write as specimens of :—
(*a*) Large-hand :—
Algebraically, Bellerophon, Catastrophe.
(*b*) Small-hand :—
A little more than kin, and less than kind.

2. (*a*) Analyse the following, and parse words in italics :—
I *proceeded* towards London on a fine morning, no *way* uneasy about to-morrow, but *cheerful as* the birds *that* carolled by the road, and comforted myself *with reflecting* that London was the *mart where* abilities of every kind were *sure* of meeting *distinction* and reward.

(*b*) Explain the various Nominative and Objective Cases.

(*c*) Give some account of the Anglo-Saxon 'Chronicle.'

3. Work the following :—
(*a*) Find L.C.M. of 20, 12, 15, 18, 4; and the G.C.M. of 702, 1368, 1944. Ans. 180; 18.

(*b*) State and prove the rule for finding the L.C.M. of three numbers.

(*c*) What is a measure, a common measure, the greatest common measure? Find the G.C.M. of 1019527 and 1231845. Ans. 2003.

(*d*) Find the G.C.M. and L.C.M. of 157 days 7 hours 4 min. 7 sec. and 243 days 2 hours 11 min. 49 sec.
Ans. { 14 days 7 hours 11 min. 17 sec.
{ 2674 days 0 hours 9 min. 59 sec.

(*e*) What is the least number which leaves 4 as a remainder when divided either by 9, 99, 999, or 9999?
Ans. 1,109,893.

(*f*) Five horses start together, and continue running round a circular course which is two miles in circumference. If they run respectively 18, 16, 15, 12, and 10 miles per hour, how soon will they be again together at the starting point?
Ans. 2 hours from starting.

(*g*) Find in grains the least weight which can be expressed by an exact number of ounces in both troy and avoirdupois weights. Ans. 84,000 grains.

4. (*a*) Name the chief productions imported into Great Britain from her possessions in Asia, specifying the place from which each of them comes.
(*b*) Describe a journey from Paris to Berlin.
(*c*) What are the chief industries of Germany, and in what parts are they carried on?

5. (*a*) What were the chief changes brought about by the Norman Conquest?
(*b*) Give some account of the rise and settlement of the Investiture Dispute.
(*c*) Give brief lives of Hereward, Lanfranc, Anselm, and Robert of Gloucester.

6. Write notes of a lesson on one of the following :—
(*a*) A Cape, (*b*) Short Division, and (*c*) Moods of Verbs.

7. What do you understand by the term 'Food'? Why is food required?

CORRESPONDENCE.

(*See December for Rules.*)

All communications and queries with regard to the PUPIL TEACHERS' AND SCHOLARSHIP COURSE should be addressed to 'A. T. FLUX, 12, Lower Park Road, Belvedere, Kent.'

ANSWERS TO CORRESPONDENTS.

JOYCE.—Pupil Teachers are allowed provided their engagement terminates before that age. Non Pupil Teachers are not allowed. Needlework very good. Writing 45/60. Small-hand requires practice from a good model. Map 23/30. Make your outline darker. Keep printing horizontal as far as possible.

A.P.W.—The certificate is granted on an examination by one of the qualified examiners of the Tonic Sol-fa College. Write to Messrs. Curwen & Co., Warwick Lane, E.C.

RUBY.—Map 25/30. Grammar good. You have put two objects after the verb *to be*; this is not correct. 'Seems' cannot form a predicate by itself. Writing 40/60.

PEARL.—Writing 45/60. Map 12/30. Grammar, fair. The analysis is incorrect. 'By you' cannot form the subject of a sentence.

CORAL.—Penmanship 40/60. Lack of firmness. Map 20/30. Printing should be firmer and bolder. Shade coast with a little blue lead. Grammar fair. The last two lines are an enlargement of 'means.' 'Cut' is a participle, and cannot form a predicate.

ANSWERED BY POST.—F.T.S. (Rye); M.C. (Brampton); B.E. (Tours); J.P.R. (Shepherd's Bush); J.R. (St. Asaph); B.B. (Downham); F.P. (Southwold); J.S. (Kingwood); E.B. (Fowey); R.E.D. (Okehampton); M.H. (West Hill); R.P. (Bishop Auckland).

New Composition Stories, New Dictation, and New Reading Tests, will from time to time appear in our columns.

PRIMARY EDUCATION IN BELGIUM.

(*Continued.*)

BY CHAS. JAS. ADDISCOTT.
Vice-President of the N.U.T.

INSPECTION.

IN my last article I attempted to explain the position which the primary teacher occupied towards the State. He is a servant of the State through the Commune. The State trains him, finds him an appointment, guarantees to him the payment of a legally fixed minimum salary, continues the salary at a slight reduction should circumstances, other than his own misconduct, cause his school to be closed; determines the subjects he is to teach, sets out his duties in detail, fixes his holidays, places him more or less atthe disposition of political and religious parties; and although he is made to play the part of shuttlecock between these parties, the State takes care that he does not come to the ground and be trodden under foot of the opposing sides in their mad haste to win the game.

I have been asked the very natural question—'In what way does the State come into actual contact with the work of the teacher, and what security does it take that the school iscarried on efficiently?' In other words, are there inspectors, what are their duties, and how does the position of the teacher towards the State stand affected by the interposition of inspection?

These are the questions with which I now propose to deal. At the outset it must be stated that, although there are inspectors who carry out their duties on behalf both of the State and the Commune, there is not, and never has been, in the whole educational history of Belgium, anything at all resembling that which has been known in England by the term Inspection or Examination previous to 1896. We have been gradually approximating to the Belgian system by our more recent reforms and developments, leaving behind us individual examination, moving tentatively through 'sample examination' towards 'visits of surprise,' then reaching 'visits without notice,' and ultimately a gentle walk around on the part of the inspector as 'the helpful and sympathising friend of all concerned in the work.' In Belgium a school is either efficient or it is not; there are none of the fine distinctions with which we are familiar, distinctions marked by a graduated scale of pence and platitudes.

I propose to give in detail the various grades of inspectors employed, and also, as far as possible, the conditions of appointment, salaries, and duties. The two classes of inspectors who come into direct relation with the teachers in the primary schools, are the Chief Inspectors and the Cantonal Inspectors.

1. *The Chief Inspector.*—Of these there are eighteen—two for each province; they are appointed by the Government Department, the 'Ministère de l'Interieur et de l'Instruction publique,' with salaries which range from 5,000f. to 7,500f. a year, with travelling expenses of 15f. a day, to a maximum of 2,400f. a year. One of the new regulations which came into force in January 1896, thus determines one of the conditions of appointment, 'must have been a Cantonal Inspector'; before this, the Chief Inspectors were selected mainly from the professors teaching in a Normal School. They are supposed to visit each school at least once in two years; this is not always found to be possible; all aided schools come under their observation, including those which are essentially Communal, built and maintained by the Commune, those taken over by the Commune from the religious bodies ('écoles adoptées'), and those under denominational or private management receiving any subsidy ('écoles subsidiées'). They each send an annual report addressed to the Minister of Education; the nature of this report might be inferred from its title, 'tableaux statistiques.' In addition, he reports sometimes to the Government, at other times to the provincial authority, upon the general condition of the teaching *personnel* of his district. Should he find a teacher so seriously at fault, professionally or morally, as to call for his intervention, there is placed at his disposal—for choice—this scale of 'peines disciplinaires':—blame, placing 'en disponibilité,' suspension, revocation of the diploma. The recommendation to impose either of these penalties is of extremely rare occurrence, and when recommended, there always remains the right of appeal to the King.

2. *Cantonal Inspectors.*—The Cantons, or 'Cantons Scholaires,' are the school districts organised by the law of 1879, and presided over by an inspector. These Inspectors are of three classes, according to years of service. The salaries are, in the three classes, 3,000f., 3,300f., and 3,600f. a year, with travelling expenses of 7f. 50c. a day, to a maximum of 1,200f. a year. There are 80 of these Inspectors; 42 exclusively Flemish, 36 French and Flemish, two French, Flemish, and German, and, as their name implies, they are appointed by and report to the authority of the Cantonal district in which they work. This authority is 'le Collège des bourgmestres et échevins,' and from the members, one échevin or alderman is especially charged with the duty of superintending the instruction given in his district; he is, in fact, a local Minister of Education, as Matthew Arnold would say, 'upon a lower plane.' He is generally a man well-known for his interest in, and, occasionally, his knowledge of, public education, and, to quote from the official 'Reglement,' 'il est aidé par un directeur ou un Inspecteur des écoles primaires.' The conditions of appointment here are that he must have passed the examination prescribed by the law of January 1896. Previous to that date, they, too, were selected from the professors of the Normal Schools, and too often for their political or clerical opinions. All fully qualified teachers, heads of schools of at least three classes, are eligible for this examination, but as it is considered to be very difficult and detailed and the number of candidates very large, the chances of success become very small. The law of February last also requires satisfaction of the lingual difficulty; if, in the Canton, there be one or more Flemish-speaking Communes, the candidate must satisfy the authorities that he has a knowledge both of Flemish and French, and should it include a German-speaking Commune he must know German and French. This law works very unequally; for example, out of the 29 Communes in the 'Canton Scholaire,' of Soignies, with 75,662 inhabitants, there is only one of 1,709 inhabitants which is ranked as Flemish. A large majority of the Cantons have Flemish-speaking inspectors; the Walloons are naturally jealous. These considerations, and the fact that it cuts out so many teachers from the inspectorate, have brought the teachers to the opinion that in the interest of unity this classification of Communes should, for the purposes of school inspection, be abolished, and that the Inspector should know the language generally spoken in his district.

His duty is to visit each school twice a year; and it is imperative that he should visit, at least, once. He reports to the Chief Inspector every three months upon the schools visited, upon such matters as school building, apparatus, conditions of the teaching and teaching staff. In addition to this, each, for his own district, sends in a 'tableau statistique.' There is also a report for each school, which is sent both to the Chief Inspector and to the Communal Administration. The fact that this report is never published, and is deemed so private that neither its text nor its tenor is ever communicated to the teacher, constitutes one of the most acute grievances under which the teachers suffer at the present time. A very animated discussion upon it took place at the recent Conference of teachers at Liège. Needless to say, my own repeated efforts to get a sample of such reports has failed. There is, therefore, a feeling of unrest, and the suspicion is, no doubt, well founded that when an application for promotion or for an augmentation of salary is refused, the refusal is probably due to the nature of the report. It is whispered that, through some friend in court, a teacher here and there has obtained the forbidden knowledge. Many, with a long and strong record behind them, care little about the matter; 'it can do me no harm,' says one, 'but for my confrères in other Communes it is "toute une autre chose."' The report, officially described as 'Tableau des visites de classes faites pendant le . . . tri-

mestre de l'année, 189,' takes the form of a printed sheet of 25 columns. Here are the headings :—

Number.	*Teachers' Journal.*
Date.	Children's exercise books.
Commune or Section.	School collections — of natural objects, etc.
School, primary, guardian or adult.	Manual work.
The position of the class in the six years' school course.	Any work outside the prescribed course.
Name of the teacher.	Aptitude and zeal of the teacher.
School premises, house, garden.	Methods and processes.
Number present, absent, on roll.	Progress.
Order and discipline.	Temperance Society.
Education.	Branches desirable to introduce into the school.
Employment of time.	Observation and general appreciation.
Registration.	

The report entered against each detail of school work is simply 'T.B.,' 'B.,' 'P.,' or 'Ins.,' which, being interpreted means, 'très bien,' 'bien,' 'passable,' 'insuffisant.' As already explained the term 'classe' must here be understood to mean 'responsible teacher,' and it will be observed that there is here no report on any one individual subject taught in the school nor upon any individual child.

Every responsible teacher in a Belgian primary school enjoys the privilege of an absolutely free classification of his scholars. Although the inspector in no way interferes with this, it is his duty to see that the school itself is rightly classified with regard to the number of the staff, that its rank as a school of one, two, or three classes is maintained. The time during which a child is supposed to be at school is divided into three periods, each of two years : (1) le degré élémentaire ; (2) le degré moyen ; and (3) le degré supérieur. Evidently this arrangement must be modified by the size of the school—in other words, by the number of teachers employed. The schools are classed as 'à un seul classe,' or 'à un seul instituteur,' 'à deux classes,' etc. ; and it is a requirement that the Communal authority shall, after consultation with the head teacher, determine the number of divisions in which the school may be worked. In a school with one teacher, 'le degré élémentaire' will be, of necessity, two divisions—those who have been respectively one and two years ; to have two divisions in the 'degré moyen' or in the 'degré supérieur' would be impossible, and therefore these are taught together. In such a school there would be four classes. In a school of two teachers a similar arrangement would obtain, while in a school of three or more teachers the lowest and middle division might be divided into two, while the upper division might or might not be so divided according to the number in it. Of course, in a very large school any one of these classes might be divided into two, the work of each running parallel to the other. In the more advanced and populous Communes, and in large towns, there is in the school a fourth degree (degré complémentaire) open to pupils who have passed the six degrees. The teacher changes a child's class position when he pleases, but everywhere throughout Belgium the month of October is the recognised time for general promotion : has our able Foreign Intelligencer to the Education Department—Mr. Sadler—yet recommended this universal school year, and how long are we to wait to find it adopted throughout England ?

Any account of the duties of these inspectors would be incomplete without a reference to what is a conspicuous feature in the Belgian system, viz., the quarterly Conferences between the Chief—or, failing him, the Cantonal—Inspector and the teachers in each district. These are held in each school *à tour de rôle*. Criticism lessons are given by the teachers of the school in which the Conference is held.

The criticisms upon these lessons, drawn up by all the teachers present, are within twelve days sent in to the presiding inspector ; these criticisms are, in their turn, criticised by the inspector at the next Conference. In addition to this, each teacher sends in a paper upon some subject proposed three months beforehand by the Chief Inspector, and these, too, are commented upon at the next Conference. The subjects vary within wide limits ; at one time a pedagogic subject may be chosen—*i.e.*, classification, or the method of teaching a certain subject ; at another, some question in psychology or morals. To the inspector's criticism on these is added a general summary of the subject as a whole ; he also improves the occasion by bringing before the teachers the latest ministerial requirements, regulations, circulars, etc.

No teacher is supposed to absent himself or herself from these Conferences ; 3f. are paid to each for travelling expenses. Thus they not only involve the four attendances, but the sending in of eight written documents during the year, and the teachers naturally complain that this is *bien ennuyeux* and unnecessary, that they are never out of leading-strings, nor their training complete. Their desire is not to suppress the Conferences entirely, but to lessen the labour connected with them. It is rightly claimed that criticisms from two or three teachers instead of from the whole would meet the case, and while, as a teacher, I agree with them, my agreement would certainly be even more sincere were I an inspector, the labour thrown upon him must be enormous if he really performs it.

It may here be mentioned that neither the inspector nor the teacher is directly responsible for the choice of books used in the school. This choice is made by 'Le Conseil de Perfectionnement,' a Council nominated by the Minister. Any teacher or other person who wishes to get his work introduced into the schools sends it to this Council. If accepted and adopted the teacher is at liberty to requisition it, and the author to inscribe upon his title-page 'Recommandé par le conseil de perfectionnement de l'enseignement primaire.'

3. *Inspector of Normal Schools.*—This gentleman stands alone, the apex of the inspectorial system. He receives a salary of 8,500f. and travelling expenses. His duty is to visit and report upon to the Minister the work of the Normal Colleges, with special reference to the professors and teachers employed. These must be sufficient and efficient, and the 'peines disciplinaires' are the same as those already mentioned, and can be recommended by him for moral or professional shortcomings.

4. *Inspectors of Secondary Schools* (L'enseignement moyen supérieur et inférieur).—Of these there are three, paid respectively 8,000f., 7,500f., and 7,000f., according to years of service. With their responsibilities and functions we are not here concerned.

5. *Inspector of Free Education.*—This functionary is not, strictly speaking, a school inspector, and his exact position is somewhat difficult of definition. Scholars are admitted free upon the parents' proof of inability to pay. These same parents, naturally, are on the lists of charitable organizations, and these are, for the most part, connected with the religious organizations, hence we shall get somewhere near the truth by describing this gentleman as the educational charity organization relief officer. His duties vary with the importance of the local body he represents. He may or may not be connected with a religious body ; he may represent the 'chefs de cultes' already spoken of, or 'les petits-frères,' and as such his *rôle*—to a layman at least—remains an unknown quantity, and to the true educationist 'une quantité negligeable.'

6. *Special Inspectors for Special Localities.*—The large towns appoint their own. The salaries vary from 5,000f. to 7,000f. They visit all the educational institutions under the wing of the Communal authority. These always include 'Écoles d'adultes,' or Continuation Night Schools ; their reports go to the échevin of public instruction. A lady is similarly employed to visit and report upon the Froebel schools.

7. There are also 18 female inspectors, or rather visitors, looking into and advising upon needlework. They are not salaried, and receive only travelling expenses.

8. The Secondary and Normal Schools have the advantage of the services of a special inspector of physical exercises, and with him we close the list.

Upon review, we are apt to have the impression that there is 'something too much' of inspection in Belgium, but by comparison with his English confrère I doubt if the Belgian primary teacher can be said to be over inspected. He touches this list, to any effective purpose, at one point only —the Cantonal Inspector ; and from him he cannot—or may we say he does not—receive much harm. The Belgian teacher

has his grievances. I have frequently heard them discussed upon the platform, and read of them in the 'Journal des Instituteurs' and other publications, but have never once heard a word of complaint of the direct relation in which the teacher stands to any class of inspectors. On the contrary, it is no uncommon thing to find an appeal made to the inspectors to help the teacher in obtaining better conditions of service. Mons. A. Kerstlied, in his little book, 'La Vie et le Sort de l'Instituteur en Belgique,' makes such an appeal, and as this sums up at the same time the teachers' grievances, I close this article by quoting him :—

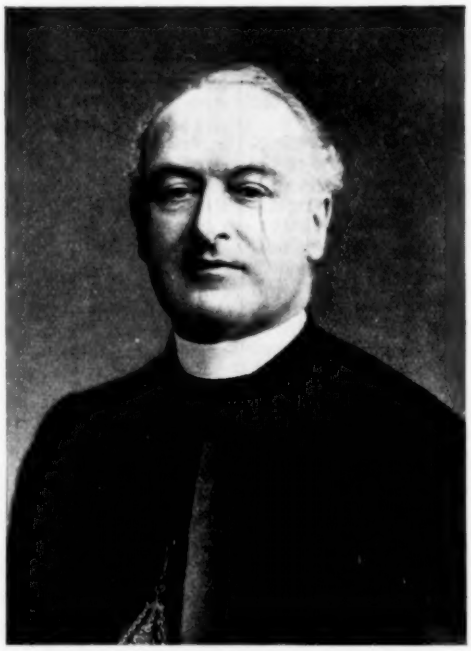
'Messieurs les inspecteurs aussi peuvent beaucoup pour améliorer le sort de leurs subordonnés. Ils savent, mieux que personne, la charge écrasante des maîtres d'écoles rurales, leurs déboires, leurs ressources précaires. À eux de continuer à signaler vigoureusement et sans relâche aux autorités supérieures tous les faits de nature, à mettre en évidence les iniquites, les cruautes même que le régime scolaire actuel permet, et le manque d'encouragement qui ne vient jamais réchauffer le zèle, récompenser le travail et les succès de nombre d'instituteurs méritants.'

CARDINAL VAUGHAN ON THE TRIANGULAR BATTLE FOR EDUCATION.

THE GREAT POLEMIC.

THE present year will in all human probability mark the longest reign recorded in our annals, and, as is most meet and fitting, men's minds are bent on devising a permanent memorial not only of the length, but of the glory of the Victorian era. Suggestions 'come not in single spies, but in battalions,' and here is that of the PRACTICAL TEACHER—Put our educational system on a firm and lasting basis !

Of this consummation surely 'most devoutly to be wished,' unfortunately, there are but few signs, rather are alarms and excursions the order of the day, and on all sides may be seen no uncertain indications of warlike preparations which it is to be feared, bode but little good to national education. Hence Cardinal Vaughan, in the *Dublin Review*, heads his contribution to the great polemic 'The Triangular Battle for Education,' the three corners to the triangle being the Dissenters, regarded by His Eminence as representing the School Board system, the Church of England, and the Roman Catholics. The article commences with an historical preface in which are set out the beginnings of State-aided popular education, which, culminating in 1870 in the establishment of School Boards, was, argues the Cardinal Archbishop, nothing short of handing over the education of Young England to the Nonconformists, who year by year fortified, by successful work, the mighty stronghold thus acquired, one of their achievements in this connection being the capturing of certain numerous adherents of the Church of England 'loosely attached,' says the Cardinal, 'to the establishment, perhaps by political and social threads rather than by any strong religious convictions.' This is Cardinal Vaughan's way of admitting that many staunch supporters of the Church of England, both lay and clerical, refuse to regard what the Cardinal calls the New Religion, the nasty, ugly, misshapen beast of Mr. Athelstan Riley, as answering in any degree to this description. It is their reluctance to vilify religious instruction as given in the Board School, and not their inappreciation of the needs and necessities of the Voluntary School that has caused them to be held up to contumely as weak-kneed supporters of their kirk. 'Look to your establishment,' cries His Eminence. 'We should regard its downfall as a *present calamity* (the italics are ours), although some Catholics would rejoice to see the immediate disestablishment and disendowment of the Anglican Church.' To this end should be voiced the unalterable battle-cry, to wit, 'participation in all aids, both state and rate.' This is our minimum. Rejecting this line of policy the Anglican is invited to contemplate the *débacle* of the State Church in terms that are, we opine, calculated to alienate as many as the well-known burden 'The Church in danger !' is likely to attract. 'The cynical chronicler will observe that it ended as it began, in dishonour and dishonesty. It began by robbing and persecuting the Catholic Church, and it ended in being betrayed, robbed, dishonoured, and disestablished by its own children.' We regret this ink-slinging at the School Board system and at the Nonconformists all the more because His Eminence makes out such an excellent case without it, and we can assure him that he is woefully at sea when he contends that the backers of the School Board system and the opponents of the rate-aid movement are 'a number of honestly - mistaken Nonconformists, Agnostics, Materialists, Rationalists, and men of the world who care nothing for Christianity.' There are many who, like the PRACTICAL TEACHER, approach the subject with no political bias, with no sectarian bias, but with a single eye to the educational weal of the country. Such thinkers, and their name is legion, will admit and deplore the poor condition of Catholic Schools, and—albeit the Cardinal Archbishop does not dwell upon this most important aspect of his subject—of the devoted band of Catholic teachers whose slender salaries bear eloquent testimony to the great sacrifice they are hourly making for the cause of Catholic popular education. They agree that much zeal has been shown, that much money has been raised, and that present wants only too cruelly militate against the proper education of the Catholic youth of this country. For all this the article in the *Dublin Review* gives chapter and verse, so that the exigency of the situation is admitted on all hands. What is the remedy ? Cardinal Vaughan demands that School Boards shall rent, at cost price, places in denominational schools, and he is so far right-minded as to allow the contributing Boards to have representation on a Committee of Control, to which the Managers of Voluntary Schools shall, to some extent at all events, be responsible, but he combats with all his force the idea that 'rate-aid implies ratepayers' management.' 'This theory is based on quotations from certain politicians and Protestant ecclesiastics, quotations which show how superficial has been the consideration that has been given to the subject. That the Duke of Devonshire and Mr. Chamberlain should honestly maintain this theory is scarcely credible—though to advance it may serve a political purpose. For what does it come to ? Simply to this, that whoever purchases an article has a right to control the manufacture of it, and by their interference with control to expose the same manufactures to serious loss and injury. Was ever such a theory advanced in trade or commerce ? Would it stand for a moment in the marts of the world ? Then, if not, why apply it to the production of the commodity called elementary education ?'



HIS EMINENCE CARDINAL VAUGHAN.
(*Photo Stereoscopic Company.*)

In a letter to the *Times*, on the 9th January, Cardinal Vaughan follows up his article in the *Dublin Review* by the

advocacy of this purchase of education at cost price with limited control. One effect of this letter was a communication from Dr. Jayne, Bishop of Chester, to Cardinal Vaughan, in which the Doctor more than hints at the transference of his political influence and adherence from the Conservative to the Radical party, a course of action which the Cardinal Archbishop also admits as a *dernier ressort*, should the powers that be prove obdurate in refusing to specifically promise to endeavour to carry, by piecemeal or wholesale legislation, rate-aid for Voluntary Schools. The reply to this thinly-veiled threat was in print even before the two letters were made public, for, speaking at Manchester on Saturday, 9th January, Mr. Balfour, as most of our readers will know, specifically and categorically told the very fathers of rate-aid that no attempt would be made to carry any such measure in the proposals to be submitted to Parliament. Commenting upon these letters, the *Times* says 'that its pronouncements may be taken as authoritative in this connection. The wrath of the Bishop and of the Cardinal may some day fall as heavily upon the Unionist party as they seem to anticipate, but that is no reason why the Government should forthwith commit suicide. . . . The best that is possible may be denounced as a sop or a dole, but until the Bishop can dictate the voting of the House of Commons, that is all he and his friends can hope to obtain.'

We rose from the perusal of these letters and articles with mixed feelings which, we venture to affirm, will be shared by our fellows both of the Anglican and Roman persuasions. Deeply do we sympathise with the poor estate of our colleagues in these money-lacking yet good-producing schools, and we clamour with them for speedy and generous succour, the effect of which would be the amelioration of the condition of teacher and scholar alike; but, as well-wishers of all teachers and of all attempts to educate the masses, we resent any attempts to be-spatter or be-little School Board education, at the same time as we poipt out how short-sighted and how certain to damage rather than to upraise the Voluntary School, and the voluntary teacher, such unsagacious tactics are.

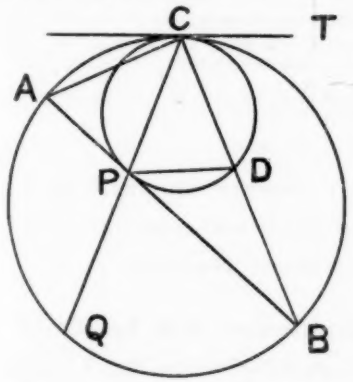
QUERY COLUMN.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the *coupon* which appears on the back wrapper of the current number of the Journal.
3. Correspondents must in all cases state the source from which their query has been obtained.

The Editor of the PRACTICAL TEACHER reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Lex.—C is the point of contact of two circles which touch each other internally, and CPQ is a straight line cutting the inner circle



at P and the outer circle at Q; the tangent to the inner circle at P cuts the outer circle at A and B; show that the arc AQB is bisected at Q.

The first statement suggests drawing the common tangent CT. Draw CPQ and the tangent at P. Now if we have to prove that arc AQ is equal to arc QB, we naturally try to prove that the angles standing on these arcs are equal; this suggests drawing AC and BC and proving that ACQ = BCQ.

By III. 32, BCT = CPD, and also BCT = CAB; hence CPB = CAB.

Considering the triangles CAP, CBP, it is only now necessary to prove that the angle CPA = CDP; but this is so since AB is a tangent at P (III. 32); consequently, the remaining angle PCA = DCP, and therefore the arc AQ = arc BQ (III. 26).

J. Rhodes.—A hollow cone, whose height is 6 in. and radius at the base 2 in., is inverted and filled with water to the depth of 5 in. How many marbles, $\frac{1}{2}$ in. in diameter, must be dropped in so as just to bring the water to the brim?—'Hiley's Mensuration.'

Let x be the number of marbles.

Then, since the cone is filled partly with water, and the rest with marbles,

Space occupied by marbles + space occupied by water = volume of cone.

Or, $x \times$ (volume of one marble) + volume of cone 5 in. high, radius of base $\frac{5}{6}$ of 2 in. = volume of cone 6 in. high, radius of base 2 in.;

i.e., $x \times \frac{4}{3}\pi(\frac{1}{4})^3 + \frac{1}{3}\pi(\frac{5}{6} \times 2)^2 \times 5 = \frac{1}{3}\pi(2)^2 \times 6$.

From this equation we find that

$$x = \frac{1456}{9} = 161\frac{7}{9}. \quad \text{Ans.}$$

Priamides.—A telegraph post has 5 arms, and each arm has 4 distinct positions, including the position of rest; find the total number of signals that can be made.

Adhering to the fundamental principle expressed in Art. 345, H. K. Elem. Alg., you will see that the operation of placing the top arm in a possible position can be performed in four ways; and when it has been performed in any one way, there are four ways of performing the second operation of placing the second arm, hence there are 4×4 ways of performing the two operations. Now suppose the statement in Art. 345 extended to a third operation. When the two operations, referred to above, have been performed in any one of the 4×4 ways, there are four ways of performing the third operation of placing the third arm; hence, there are $4 \times 4 \times 4$ ways of placing the three arms. Clearly, then, it follows that there are 4^5 ways of setting the arms. But apparently the signal given by the arms when in their positions of rest has not to be counted, hence the answer is $4^5 - 1$.

'*Pax*,' *Gibraltar.*—The sum of the sides (legs) of a right-angled triangle is 73, and the difference of the squares of the hypotenuse and a perpendicular to it from the right angle $\frac{6302881}{2809}$. Find hypotenuse and perpendicular.

Let x = hypotenuse, y = perpendicular, a and b the lengths of the two sides.

If a figure be drawn, we see that

$$ab = xy = \text{twice area of triangle};$$

also, $a^2 + b^2 = x^2$.

$\therefore \quad x^2 + 2xy = a^2 + 2ab + b^2 = (a+b)^2 = (73)^2 = m$, say.

Let $\frac{6302881}{2809} = n$.

Our two equations are

$$x^2 + 2xy = m \ldots (1)$$
$$x^2 - y^2 = n \ldots (2)$$

From (2) $\quad y^2 = x^2 - n$.

From (1) $\quad 4x^2y^2 = (m - x^2)^2$.

Substituting $(x^2 - n)$ for y^2 in the last equation, we get the following quadratic for x^2, viz.—

$$x^4 - \frac{2}{3}(2m - n)\,x^2 - \frac{n^2}{3} = 0.$$

The roots of which are given by

$$x^2 = \frac{\pm 2\sqrt{m^2 + n^2 - mn} + 2m - n}{3}.$$

Substituting for m and n their real values, and noting that in order to get a real value for x, we must take the + sign in the expression $\pm 2\sqrt{m^2 + n^2 - mn}$, we get

$$x^2 = \frac{7890481}{2809} = 2809. \qquad \therefore\ x = 53. \quad \text{Ans.}$$

From equation (2) $\quad y = \sqrt{x^2 - n} = \frac{1260}{53}$.

L. H., Wigan.—Yes.

OUR FRENCH PRIZE COMPETITION.

Prize Editor.—W. T. THOMPSON, B.A., LOND.,
First Class French Honours.

PRIZE AWARD—JANUARY.

The Prize is awarded to *France*, the pseudonym of E. ERNEST UNWIN, Newbury Street, Wantage.

First Class.—Tintamarre, Arbor, Jat, Normano, White Heather, Grip Fast, Zimbabwe, Mary Porteous, Friar Tuck, Lorna Doone, Surenne, Max, Belvidere, Glen Clova, Antoinette Vernet, Glanage, Celt, La Mayeux, Washington Post, Chalk, Crofter, Julie.

Second Class.—Gamut, Nortoniensis, Nemo, Lammermoor, Sténographe, Kettering, Scholastica, Melita, E. C. C., Jeanne, Bishop Leighton, Fidus Achates, Semper Fidus, Heath, M. M. Clarke, Olivia, Ecolier, Belle Mahone, Sursum Corda, Sam, Defarge, E. S., Verus, Culdee, Français, Maid Marian, Koorali, Georgics, Nox, Transitus, M. I. C., The Gloaming, Anglaise.

Third Class.—Ralpho, Touchstone, Carillon, Wellingtonia, Legiolium, M. I. P., Aurora Borealis, H. W. P., Exotic, Coed Menai, Mimsey, Sorrel, C. F. L., M. A. M., Patience, Avis, Kirkpatrick, Dandelion.

Si vous voulez recevoir de la vieille ville une impression que la moderne ne saurait plus vous donner, montez un matin de grande fête, au soleil levant de Pâques ou de Pentecôte ; montez sur quelque point élevé d'où vous dominiez la capitale entière, et assistez à l'éveil des carillons. Voyez, à un signal parti du ciel, car c'est le soleil qui le donne, ces mille églises tressaillir à la fois. Ce sont d'abord des tintements épars, allant d'une église à l'autre, comme lorsque des musiciens s'avertissent qu'on va commencer. Puis, tout à coup, car il semble qu'en certains instants l'oreille aussi a sa vue, voyez s'élever au même moment de chaque clocher comme une colonne de bruit, comme une fumée d'harmonie. D'abord, la vibration de chaque cloche monte droite, pure, et pour ainsi dire isolée des autres, dans le ciel splendide du matin ; puis, peu à peu, en grossissant, elles se fondent, elles se mêlent, elles s'effacent l'une dans l'autre, elles s'amalgament dans un magnifique concert. Ce n'est plus qu'une masse de vibrations sonores qui se dégage sans cesse des innombrables clochers, qui flotte, ondule, bondit, tourbillonne sur la ville, et prolonge bien au-delà de l'horizon le cercle assourdissant de ces oscillations. Cependant cette mer d'harmonie n'est point un chaos Vous y pouvez suivre le dialogue, tour à tour grave et criard de la crécelle et du bourdon ; vous y voyez sauteler les octaves d'un clocher à l'autre ; vous les regardez s'élancer ailées, légères et sifflantes de la cloche d'argent, tomber cassées et boiteuses de la cloche de bois ; vous admirez au milieu d'elles la riche gamme qui descend et remonte sans cesse les sept cloches de Saint-Eustache.

Translation.

If you would receive from the old town an impression which the modern one can no longer give, ascend at sunrise on the morning of some high festival—Easter or Whitsuntide—to some elevated point whence you can command a view of the entire capital, and hear the bells begin to peal. See, at a given signal from heaven, for it is the sun that gives it, these thousand churches vibrate at the same moment. At first there are only tinklings here and there, passing from one church to the other, as when musicians announce that they are about to commence. Then, suddenly, for at certain moments the ear too appears to have the power of vision, see like a column of sound, like a cloud of harmony, rise from each belfry at the same instant. At first the vibration from each bell ascends straight, pure, isolated, so to speak, from the others, in the lovely morning air ; then, little by little, as they swell they mingle, they blend, they are lost the one in the other, they unite in one magnificent concert. It is nothing less than one mass of sonorous vibrations, which, escaping without ceasing from the numberless towers, floats, undulates, bounds and eddies over the town, prolonging far beyond the horizon the deafening circle of these oscillations. Yet this sea of harmony is by no means a chaos. In it you can follow the dialogue alternately deep and shrill of the 'bass-bell' and the 'ting-tang' ; in it you can see the octaves dance from one tower to the other ; you see them flit, winged, light, and rippling from the bell of silver, and fall broken and halting from the bell of wood ; you admire in their midst the rich scale continually descending and ascending again the seven bells of St. Eustace.

FRANCE.

The papers sent in this month were about an average set.

The boldness of the poetic fancy in the sentence *Il semble qu'en certains instants l'oreille aussi a sa vue* was too much for some competitors, who did not give a straightforward rendering of it, and thereby missed the meaning and the beauty of the remainder of the extract, in which sounds are represented as being seen.

Sauteler, 'to trip,' 'to skip,' was also a puzzle to some. This verb is a diminutive of *sauter*, and is of cognate origin with the Italian verb *saltellare*, 'to trip.'

FEBRUARY PRIZE COMPETITION.

A Prize of One Guinea will be given for the best translation into English of the following extract :—

On s'aperçut très vite que le siége allait tourner au blocus, et que ces approvisionnements, faits à la hâte, sans ordre, et par manière de plaisanterie, ne dureraient pas longtemps. Toute la ville, alors, d'un même mouvement, se précipita, les main tendues, chez les marchands de comestibles. Du jour au lendemain, tout haussa de prix. Il se formait aux portes des épiciers et des charcutiers de longues queues de ménagères, qui venaient chercher du fromage, des jambons, des saucissons et autres victuailles. On riait encore, à ce moment-là, de cette empressement ; on ne se doutait guère que l'heure était si proche des détresses réelles, et des sérieuses souffrances.

Il se produisit un phénomène bien curieux, et qui serait difficile à croire, si nous ne l'avions tous constaté : c'est l'appétit dévorant dont Paris tout entier fut sur-le-champ saisi. Jamais il n'avait fait si faim sans la grande ville. Jadis on y mangeait pour vivre, et sans trop faire attention aux morceaux. Il eût été bien difficile de trouver un Parisien qui raissonât son déjeuner. Aussitôt le siége commencé, nous entendîmes tous nos entrailles crier d'une étrange manière. Nous contemplions, en passant, les vitrines des magasins de comestibles avec des yeux de convoitise ; les énormes piles de boîtes en fer-blanc, les rangées de pots où étincelaient les confitures jaunes ou rouges, ces tonnes de harengs pressés, tout cet appareil de la mangeaille qui s'étale aux montres des épiciers nous mettait l'eau à la bouche, et nous jetions sur cet espoir de nos repas futurs des regards mouillés de tendresse. Tel qui déjeunait de deux œufs sur le plat et d'un morceau de fromage, ne voulait plus se contenter à moins d'un bifteck saignant, arrosé d'une bouteille de bordeaux. L'estomac parlait-il plus haut ? l'écoutait-on davantage ? Grave question, et que je laisse à résoudre aux moralistes. Ce qu'il y a de certain, c'est qu'en prévision des jours d'abstinence forcée chacun s'appliquait à manger plus et mieux. La chère était plus abondante et plus délicate. Il semblait qu'on se dît à part soi : autant de pris sur l'ennemi ; encore un que les Prussiens n'auront pas.

FRANCISQUE SARCEY.

RULES.

1. All translations should be posted not later than February 10, and addressed :—*Prize Editor*, Office of THE PRACTICAL TEACHER, 33, Paternoster Row, London, E.C.
2. Competitors should cut out, and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should adopt a pseudonym, and send name and address written on a separate piece of paper.
4. Teachers specially employed in teaching modern languages are not eligible as prize-winners.

'Life at a German Gymnasium,' by an Ex-Gymnasiast, will appear in the columns of our March Number.

'Idola Scholarum' will be the title of the next contribution by Mr. J. Adams, M.A., B.Sc., President of the Educational Institute of Scotland.

OUR ART SECTION.

BY J. VAUGHAN,

Art Master, and Organising Teacher of Manual Training, School Board for London.

INDUSTRIAL DRAWING IN ELEMENTARY SCHOOLS.

I.

So many text books and other publications are issued on Drawing in Elementary Schools, that it may seem almost a work of supererogation to say anything more upon the subject. Yet, in the series of articles to follow this, I hope to be able to put several things in a new light: to make the drawing, especially of the lower standards, more interesting, and to show how it may be advantageously combined with other subjects.

Of the immense practical utility of drawing there can be no doubt whatever. I know it was said of old that drawing was only for the few talented ones who happened to be endued with a special gift for it; that it was of no use to teach it to those who would afterwards be called upon to follow the plough, to reap, to hedge, to drive a horse, etc. These ideas, however, were put forward before *drawing came to be recognised as such a valuable means of education;* before it was proved that everybody with average mental capacity could attain just the same measure of success in drawing as in any other kind of work; and when the *result* only was considered, while the *training* which produced the result was altogether lost sight of. Really, if *observation* is one of the most potent factors in true education (and I believe all who have to do with education, practically or theoretically, admit this), then the drawing lesson should be one of the most valuable lessons given in school. Its success depends mainly upon the power of accurate observation. I venture to think that the work done by the *hand* in drawing is oftentimes considered of far greater importance than that which should be accomplished by the *eye*. I mean that fine neat lines are considered before correct proportion and mass. When a drawing of any kind is submitted to me, I first look at it as a whole—at the general shape, proportion, mass, etc. If the actual lines are also good, so much the better, but I do not consider them first. Take a parallel case. Suppose you have to mark a sum in Arithmetic. The first thing you look at is the answer and method. Of course, we all like to see neat figuring as well, but yet this is not considered the main aim in working the sum.

It is practically the same with drawing. Neat clear lines are greatly to be desired, and we should strive to get them, but not at the expense of the form itself. It is perhaps this view which has caused drawing to be looked upon as requiring no mental effort—nothing beyond mere skill in drawing lines.

The object of these articles, however, is not to theorize, but to give such practical help as will enable the proposed scheme to be carried out in the average school. Still, if they are to be of service, I shall have to ask each reader to grant me the two points that I have briefly touched upon in the foregoing paragraphs, viz., that drawing is of great value *educationally;* that it is for *all*. I am tempted to write at much greater length on each of these points, but the present article and accompanying illustrations are merely intended to introduce the subject. One more thought, however, must suffice in the present instance. Drawing is the most natural and universal language of man; it is one of the earliest things a child attempts to do spontaneously. Can we neglect to develop such a powerful natural force in any scheme of education?

There is, too, just another phase of the question which I should like to put before you, because it is an idea that I intend to work out fully in succeeding articles: *Drawing should be the handmaid of industrial art.*

It seems almost unnecessary to make such a statement, and yet, if you will think for a moment, you will see that the drawing done in Elementary Schools at present is scarcely ever *applied* in any way. Now, I maintain that we should teach drawing and simple design, and their application from the earliest stages.

We hope to see established in the near future a scheme for Secondary and *Technical* Education. Now, will it not be just as feasible to put a pupil, who knows little or nothing of Grammar, Geography, and Arithmetic, into the literary side of the school, as to put a pupil into the technical side, who has had no previous training in Drawing and other handwork? If the schools are to be a success, the pupils entering them must have had some preparation in both.

The recently issued Alternative Drawing Syllabus recognises this to some extent, and says, 'The possible close connection of the present course of Drawing with other modes of teaching in the school should not be lost sight of. For example, at many points a good teacher may find it possible to use this course as a basis for hand and eye training in other suitable material, while the introduction of each new form, *e.g.*, the egg form, may be suitably connected with object lessons or stories on familiar objects which suggest that form.

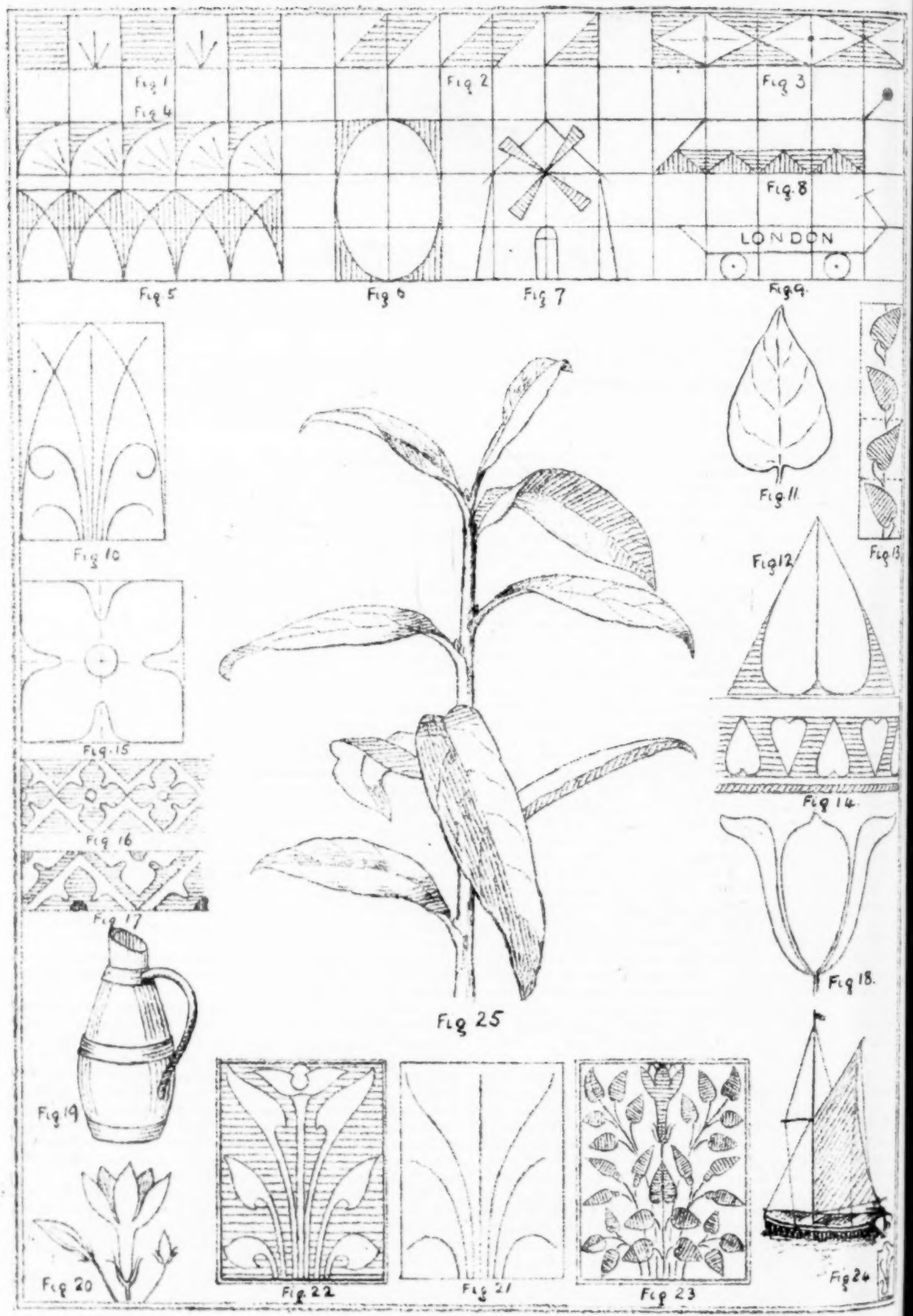
'The forms produced and their combinations will naturally suggest decorative and natural shapes, and it should be the object of the teacher to develop this association of ideas.'

The notes then go on to suggest how colour may be introduced, and I propose to deal practically with the carrying out of these useful suggestions.

In the report of the Recess Committee on the establishment of a department of Agriculture and Industries for Ireland (August 1896), special stress is laid upon the value of Drawing. It shows how far other nations are ahead of us, as far as the organisation for industrial art education is concerned; and what a wide field there is for artistic handicraft at home, if only Drawing and manual dexterity were more widely cultivated. 'It is a significant fact that these flourishing cottage industries of Russia, and those of Bavaria, of Bohemia, of Würtemburg, of Switzerland, and the Austrian Tyrol, find their chief market in Great Britain and Ireland.

While this commercial side of the question is not, of course, to be lost sight of, I think perhaps we should lay greater stress upon the educational side—the development of mental power and manual dexterity, irrespective of whether the things produced have any intrinsic worth.

The accompanying illustrations are intended to show broadly the scheme of work. You will notice that there is



The squares at the upper portion of the plate represent one inch. The present examples are only intended to illustrate the style of work ; they will be given to a larger scale subsequently.

really nothing new; I have simply taken the illustrated syllabus of the Science and Art Department for the text, as it were; but I intend to use the elements of each stage in an entirely different way from that shown there. At the same time I want to make the work practical, and not above the capacity of the average child. If I transgress in either way, I am sure some of our readers will be good enough to tell me.

The first exercises consist of straight lines; but instead of using these to produce isolated examples of lines, angles, etc. (which really represent nothing to the child), they are worked up into simple designs, as Figs. 1, 2 and 3.

I know from actual experience that children take a great interest in doing this simple pattern work. The shaded portions may be filled in with parallel lines drawn with black or coloured pencils, or the spaces may be filled in with colour put on with the stump.

Then curves are introduced, as Figs. 4, 5 and 6, or simple interesting objects which may readily be adapted to squared paper. All the varieties of lines—horizontal, vertical, oblique, straight and curved, and of angles—right angle, acute angle, obtuse angle, are introduced, and should be pointed out as they occur. If you have not already tried this pattern work, do so now; I am sure you will be satisfied with the result. The size of the squares should be about an inch—the same kind of paper as that recommended for brushwork.

The next stage introduces exercises done partly with the ruler and partly by freehand. In Fig. 10, for example, the rectangle should be accurately measured and drawn with the ruler, and the surface decorated with the curves afterwards. It has always seemed a mistake to me to have a drawing done altogether with the ruler, or altogether by freehand, instead of combining the two, as every practical workman does. Fig. 11 is the drawing of a natural leaf—lilac, while Fig. 12 is a conventional representation of the same, to be utilised in simple design. Figs. 13 and 14 show two examples of borders made from this unit. When I come to deal with this section separately, I shall show how to duplicate the units, and also suggest how to make the patterns the basis of manual exercises. Figs. 15, 16 and 17, are other illustrations of the same idea. Fig. 18 is a free drawing of simple ornament; Fig. 19 a model drawing of a quaintly-shaped jug. Figs. 21, 22 and 23, are other illustrations of simple designs. In Fig. 21 the leading lines only are shown; in Fig. 22 similar lines are clothed with simple ornament, and in Fig. 23 with more difficult detail (jasmine leaf, bud and flowers—see Fig. 20). Fig. 24 is a little pictorial drawing, and Fig. 25 the sketch of a freely-growing spray of laurel.

Glancing back you will see that we have the simple exercises in design on squared paper, say for Standard I. and partly II.; then ruler and freehand work combined, simple natural ornament, and its application to design for Standards III. and IV. The geometrical portion of the work (*i.e.*, the 'setting out') may be done with ruler and compasses in these standards if it is thought advisable. Drawing from the 'round' will be added in Standard V., gradually working up to drawing from nature, as Figs. 20 and 25, and utilising the elements so learnt, in design.

Space forbids me to say more, but perhaps I have said sufficient to indicate broadly the course to be pursued. Each stage will be dealt with fully and separately, and sufficient examples given to illustrate the scheme.

Since the foregoing was written, the following paragraph appeared in the *Schoolmaster*. I venture to quote it, as it bears strongly upon the view expressed at the commencement of this article :—

THE 'DESIRABLE' IN FREEHAND DRAWING.

A correspondent has recently written to the Science and Art Department desiring to know whether it is necessary for children to completely line in their examination exercises in Freehand, and to what points, in particular, the examiners direct their attention in estimating the award made in this subject. He has received the following reply :—

'In freehand drawing it is desirable that the exercises should be furnished in a line sufficiently strong to show the forms with clearness, and the rough sketching should be taken out. More important, however, than the quality of line are proportion and correctness of form.'

(To be continued.)

BRUSH DRAWING.

II.

IT has been suggested to me that I should make this series of articles of greater practical value, by dealing with a definite stage of the work in each paper. As my chief aim is to render the greatest possible service to all those who are now taking up this work, or will do so at some future time, I most willingly comply with the request. I may say, too, that I shall be most willing to render any assistance in special cases, if those readers who need it, will kindly address their communications through the editor. Oftentimes, I know, difficulties arise, which perhaps would not occur to me (though I have *practically* tried nearly all the exercises given), but which a few words of explanation would readily smooth over.

As pointed out in the first paper, the initial exercises would be arrangements of the blob only, continued until the children have sufficient command of the brush.

When proficiency is attained in this, introduce the *short straight line and the dot.* [The present article deals exclusively with this stage.] Next the double blob with the preceding elements: next the curved line.

The four stages would then be as follows :—

First Stage.—Exercises with the blob or brush impression.

Second Stage.—Exercises with the blob, short straight line and dot.

Third Stage.—Exercises with blob, short straight line, dot, and double blob.

Fourth Stage.—Exercises with single and double blobs, straight and curved lines, and dot.

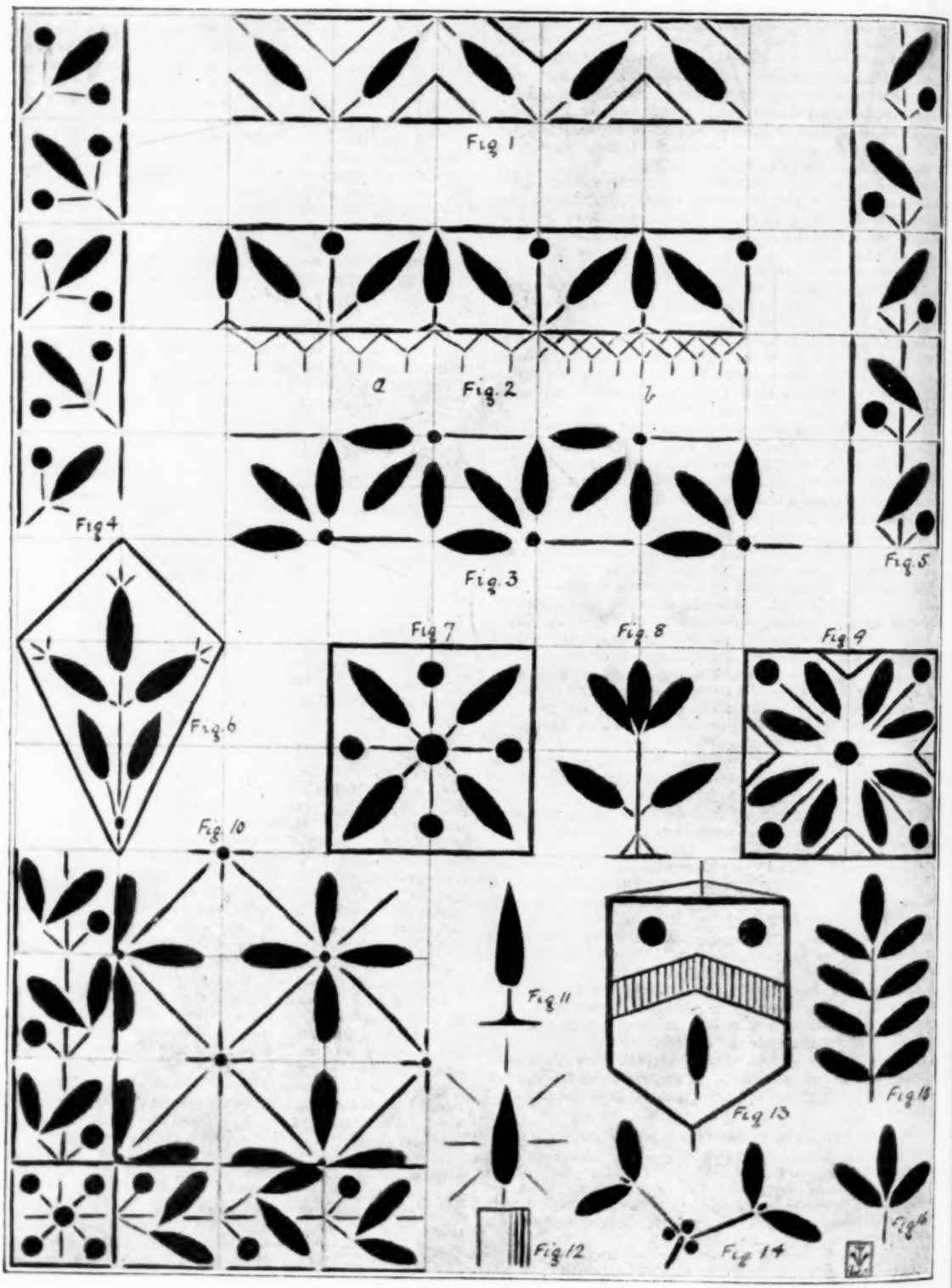
It will readily be seen that though such a grading may be carried on in any school, and in any standard of the school, yet the amount of work attempted in each stage will vary with the particular circumstances of the school, and also with the Standard. For example, if brush drawing be started for the first time, say, in Standard V., we should not keep these children three months at merely making blobs. They would probably only need four or six lessons, at the outside, in this preliminary work; but if the subject be commenced in Standard I., then I think three months could profitably be spent in thoroughly mastering this elementary step. The four stages enumerated above will probably provide sufficient scope for Standards I. and II.

I have not the least desire to lay down any rule as to how much should be done in each particular class, or in any given time. It would be presumption on my part to assume that I know more of the capabilities of the class than the teacher himself. All I can do is to put before you the order in which the various elements should be introduced, and to give a sufficient number of exercises in each stage, to ensure a fair amount of proficiency in it. How many of these exercises a particular class will do, is for the teacher of that class to decide. I am assured by those who have done this work practically in school, that there is nothing on the accompanying sheet of illustrations beyond the scope of Standard I., given of course, the squared paper to help them.

For myself I should be content if in this standard they left out Figs. 6, 9, 10, 13, and the 'fringe' shown at *b* in Fig. 2. This would then leave them a dozen examples, which together with another twelve based upon them, would constitute a most satisfactory three or four months' work. I would again point out the *educational value of making original exercises* —and I shall have to ask you to bear with me patiently if I refer to it over and over again. True, the result may not be worth much, and we cannot expect it to be very original; but if by these exercises, the power of independent thought and judgment can be cultivated, a great deal will have been accomplished.

Teach the children to help themselves; they like this much better than having everything cut and dried for them, and there is no subject in the whole school curriculum which has greater facilities for carrying out this educational idea than brush work.

Encourage them to suggest forms of flowers, leaves, insects, etc., that may be easily rendered in the particular stage of the work. Occasionally let them try to put down their



DESIGNS FOR BRUSH DRAWING.

The squares represent one inch. Figs. 11 to 16 wou'd be drawn to a somewhat larger scale.

impressions of such things from memory, and correct afterwards on the blackboard.

Perhaps it may be as well to state here that there is a limit to the use of the blob. I do not think the children should be encouraged to look for it in too many natural forms—as though such forms existed to be produced in this particular way. We wish, of course, not only that they should study *things*, but also that their observation should be accurate. We can readily express the *growth* and *general arrangement* of many natural forms with blobs. Fig. 14, for example, is a simple rendering of the mistletoe, sufficient to impress on the minds of the children the peculiar growth and arrangement, but yet it is a long way off the natural spray. Take twenty such natural sprigs, and you will probably find that not one has perfectly flat leaves as here depicted; they all twist, and produce most beautiful curves. Similarly Fig. 15 is suggested by a sprig of box, but the leaf of this plant is not really like a brush impression in form. The rendering is sufficiently accurate to impress the growth and general structure on the child's mind, but I do not think it can be called a 'drawing from nature.' Many arrangements of brush impressions are suggested by natural forms, but personally I draw a broad distinction between such productions and accurate drawing from nature. It seems to me going somewhat out of the way to produce, say, oakleaves by brush impressions. There are numberless legitimate uses to which the blob may be put, without any undue straining. For instance, I consider it may be most advantageously employed at any period for designing, as it gives at once a more or less artistic shape, which possibly the scholar could not draw: it enables him to put in masses direct [a most important point] to which the detail may be added subsequently: but, of course, he should not be dependent upon it. It should be a servant, not a master, and this is why I should use the blob in a more restricted way than is sometimes advocated.

Turning now to the present illustrations, it is assumed that the first stage, simple blobs, has been successfully mastered. Fig. 1 is very similar to the first exercises shown in the introductory paper, but with the line added. Practise the line separately on a bit of scrap paper, holding the brush as explained last month. Be careful in this, as it is exactly opposite in method to holding a lead pencil. The pencil should be *at right angles* to the line being drawn, but the brush should be *over* the line. The rule about turning the paper does not apply to brushwork.

Put in the brush impressions first. *Always make it a rule to fix the masses before* adding the detail. Notice that the blobs are placed centrally on the diagonal of the square. Put in all five, or as many as may be required, then the diagonal line, then the small triangles, (their angles are just half way along the side of the square) and lastly the horizontal border lines. Some little difficulty will always be experienced with regard to the parts drying; this is reduced to a minimum by using fairly thick colour.

Fig. 2 will be seen on inspection not to differ very much from Fig. 1. Put in the blobs first, then the dots; afterwards add the straight lines. It will be found much better not to quite join the lines to the masses. Taking Fig. 2 to represent a border, such as a mantle drape, it would look more fitting to add a few lines to represent the fringe, either as shown at *a* or *b*.

Fig. 3 is another example of a horizontal border, using groups of three impressions. The groups on the lower line may be done in a different colour or tone from those on the upper.

Figs. 4 and 5 are arrangements for vertical borders. Both were *suggested* to me by drawing the small spray of misletoe shown in Fig. 14. I say suggested, because neither of them is very like the plant. For instance, in the natural spray the leaves shoot out somewhat at right angles to the stalk (see Fig. 14). This feature is kept in Fig. 5 but not in Fig. 4. Further, the berries are attached close to the main stalk, and have not separate stalks to themselves, as it were, as shown in these examples. In the border of Fig. 10 this idea is worked out a little further, and the arrangement of the leaves follows the natural plant more closely. As in the preceding exercises, put in the blobs first, then the dots, and add the lines afterwards.

The next group gives some illustrations of filling simple figures. Fig. 7 should be first attempted; in fact this may come immediately after Fig. 1, or perhaps Fig. 2, as it is substantially only repeating a unit of the latter above and below the diameter of the square.

The little tips at the top of the three upper units in Fig. 6 suggest the seed vessels of roses—even such small touches as these giving a distinct character to them.

Fig. 8 is a plant-like arrangement, adapted to the squared paper.

Fig. 9 is somewhat more complicated in arrangement, and consequently rather more difficult. Put in the small triangles on the sides first—their angles being about one-fourth along the sides of the squares. Always let the children have some *definite point like this to aim for*, so that all their energies and thoughts may be concentrated on drawing the line. Then put in the blobs: to guide them in this, a pencil line may be lightly drawn along the diagonal of the square if necessary. Do not hesitate at any time to give the children reasonable help of this kind. Personally I am a firm believer in the educational crutch. Both Figs. 7 and 9 may be utilised as units to cover spaces, as in Fig. 10. This latter example may of course be repeated over a fairly large space. Call it a design for a table cover, book back, tile, etc., and it will render the exercise much more interesting, set the children thinking, and cause them to notice other similar things.

Figs. 11 to 16 are exercises to be drawn on plain paper.

Fig. 11 is the conventional representation of a poplar tree, suggested by those seen in the boxes of toys. Let the children make a row, or an avenue of them.

Fig. 12 is a candle. Notice that the 'rays' are converging towards the *centre* of the light. This should be pointed out, and the vertical and horizontal lines put in first.

Fig. 13 is a simple banner form. The rectangle may, if necessary, be first drawn with a ruler.

Figs. 14, 15, and 16, are simple representations of mistletoe, box, and genista respectively. In these cases it is highly essential that the children should see the natural forms for themselves, though, as I have said, we are not trying to represent them realistically, but rather to express their general growth and structure, omitting all detail. Still by this the children will get as much information as they can digest at this age.

These examples will, I think, be found to give sufficient practice in the second stage—always bearing in mind that other original arrangements will be attempted. The exercises need not be followed out as numbered here. For example, Figs. 1, 2, 11, and 16, may form the first little group, so that we have some work on squared paper, and some on plain, as well as variety of style. Figs. 3, 4, 5, 7, 8, 12, and 15 may form the next group, and if this were being taken in Standard I., these eleven examples would probably be found sufficient. Standards II. and III. would do them all readily, as well as combining some of them to make original patterns. Certainly they look rather difficult for these standards, but if any readers took my advice in the last paper, and tried the work, I think they will bear me out in saying that it is not so difficult as it appears.

(To be continued.)

OUR CHRISTMAS PRIZE COMPETITION.

THE Prize Competition for the best reproduction, in black and white or colour, of our illustration 'Happiness in the Schoolroom' was on the whole very successful, and far above our expectations, both in the number of drawings sent in, and the quality of the work.

Many of the specimens in colour were somewhat spoiled by that common failing 'the hard edge.'

The first prize is awarded by the judges to—

Miss A. H. Bell, 21, Mount Pleasant Villas, Stroud Green, N.; and honourable mention to—

Theo. D. T. Hall, 2, Mackinnon Street, Rochdale.
Mary Clarke, The Hollies, Borrowash, Derby.
Lewis J. Gaster, 23, St. John's Terrace, Lewes.
Ernest Watson, 387, Bramall Lane, Sheffield.
Ethel Greenwood, Rose Cottage, Burley-in-Warfedale.
Bertha Marsh, 19, Capel Road, Forest Gate.
Chas. H. Fisher, 58, Howard Street, Salford.
Geo. M. Samuel, Dalkeith Road, Edinburgh (?)

The prize for the best lesson will be awarded in our next issue.

☞ **Next month we shall announce the first of a series of Prize Competitions in connection with our new Art Section.**

COURSE 'B' IN ARITHMETIC.

A COMPLETE SYLLABUS FOR A YEAR, IN MONTHLY SECTIONS, WITH TESTS.

BY B. ELDERKIN,

Model School, Westminster Training College.

For Introductory Notice and First Month see February number of PRACTICAL TEACHER, 1896.

STANDARD I.

Syllabus—11th Month.

(*a*) Revision of rules.

(*b*) Simple problems in first three rules.

(*c*) Pence tables to 60 pence.

Test.

1. Find difference between 39 and 75.

2. What number would be six times as great as 15?

3. Find the half of 76; the third of 75; and the fourth of 96.

4. There were 13 sheep in one fold, 15 in another, 65 in another. If 5 were killed out of each fold, how many were left?

STANDARD II.

Syllabus—11th Month.

(*a*) Revise all rules (Standards I. and II.).

(*b*) Problems on first three rules.

Test.

1. A grocer took 10s. 9½d. on Monday, 15s. 7d. on Tuesday, 13s. 6d. on Wednesday, 14s. 10½d. on Thursday, 8s. 7½d. on Friday, and on Saturday as much as Thursday and Friday put together; what did he take in the week?

2. What would 7 times 18s. 6½d. be?

3. Take 365 from 501.

4. A coat cost 12s. 6d., a vest 5s. 8d., and trousers 10s. 9d. What would 5 such suits cost?

STANDARD III.

Syllabus—11th Month.

(*a*) Revise rules.

(*b*) Problems in money.

(*c*) Learn tables of weight and time for Standard IV.

Test.

1. If a man spent 175 shillings, 276 pence, 3 half crowns, and seven half sovereigns out of £15, how much would be left?

2. What would 7 loads of coal cost at £7 15s. 10d. per load?

3. 18s. 10½d. ÷ 26.

4. A horse cost £13 10s., a cart half as much as the horse, and the harness half as much as the cart. Find the cost of the horse, cart, and harness together.

STANDARD IV.

Syllabus—11th Month.

(*a*) Revision of rules.

(*b*) Learn long and square measure.

(*c*) Problems on rules.

(*d*) Explanation only of metric tables of length and area.

Test.

1. Add together 3 tons 13 cwts., 5 tons 7 cwts. 3 qrs., 16 tons 19 lbs., and give your answer in lbs.

2. If a clock tick twice every second, how many times would it tick between 9 and 12 o'clock?

3. Multiply £14 13s. 6½d. by 29.

4. How many times could a quart bottle be filled from 9 galls. 2 qts.?

STANDARD V.

Syllabus—11th Month.

(*a*) Revise bills and practice.

(*b*) Simple problems.

(*c*) Learn metric table of area.

Test.

1. Find the total cost of—
   15 yards of calico at 3¾d. per yard.
   5½ ,, silk at 1s. 11½d. ,,
   9 ,, alpaca at 2s. 1½d. ,,
   3 dozen reels of cotton at ¾d. each.

2. Find by practice the cost of 275 sheep at £2 14s. 10d. each.

3. Find cost of 7 galls. 3 qts. 1 pt. at 5d. per qt.

4. How many times would a penny, which measures 1½ inches in circumference, turn round in running across a table 4 ft. 6 ins. wide?

STANDARD VI.

Syllabus—11th Month.

(*a*) Interest and proportion for revision.

(*b*) Mensuration of cubes.

(*c*) Compare metric and English tables of length and area.

Test.

1. Find the amount of £500 for 3 years 6 months at £2 7s. 6d. per cent. per annum.

2. If I spend 13 guineas in 5 weeks, and save £25 a year, what must be my quarterly income?

3. If a franc is worth 9¾d., how many francs could I get in exchange for £4 9s. 4½d.?

4. A cubical box is 3 ft. 6 in. long. If the box weigh 29 lbs. and a cubic foot of water weigh 1,000 ounces, what will be the total weight of the box when full of water?

STANDARD VII.

Syllabus—11th Month.

(*a*) Revise back rules together with averages and percentages.

(*b*) Reduction and simple examples in metric tables of length and area.

Test.

1. The average cost of 5 houses was £570. If one cost £565 and another £860, what was the average cost of the other three?

2. A grocer mixed 4 lbs. of tea at 2s. 6d. per lb., 5 lbs. at 1s. 10d., and 7 lbs. at 1s. 6d.; what percentage did he gain or lose by retailing the whole at 2s. per lb.?

3. Reduce $\frac{3}{11}$ of £3 6s. + ⅓ of ·0275 of £50 − ·25 of 7s. 6d. to the decimal of £5.

4. By selling a horse for £25 I lost 10 per cent; what ought I to have sold it for to gain 10 per cent.?

TESTS—ELEVENTH MONTH ANSWERS.

Standard I.—(1) 36; (2) 90; (3) 38, 25, 24; (4) 78.

Standard II.—(1) £4 6s. 10½d.; (2) £6 9s. 9½d.; (3) 136; (4) £7 4s. 7d.

Standard III.—(1) £1 4s. 6d.; (2) £54 10s. 10d.; (3) 8½ + 23; (4) £10 2s. 6d.

Standard IV.—(1) 56,103 lbs.; (2) 21,600 times; (3) £425 12s. 1½d.; (4) 38 times.

Standard V.—(1) £1 16s. 10d.; (2) £753 9s. 2d.; (3) 13s. 1½d.; (4) 36.

Standard VI.—(1) £541 11s. 3d.; (2) £41 14s. 9⅜d.; (3) 110; (4) 1 ton 4 cwt. 20 lbs. 11 oz.

Standard VII.—(1) £475; (2) gain $7\frac{77}{95}$ per cent.; (3) ·2508⅓; (4) £30 11s. 1½d.

A NEW AND ORIGINAL SCHOOL SONG in both Notations will appear in our next Number.

COMING MEN.

MR. W. L. DOWDING.

President, Bristol Teachers' Association; Vice-President, Bristol Board Teachers' Association; Ex-President, Bristol Certificated Assistant-Teachers' Association.

SOME years ago it was our good fortune to make the acquaintance of Mr. W. L. Dowding, who is now so well known in educational circles in the neighbourhood of Bristol. He has succeeded in winning his way to the front at a much younger age than is usual in our good old western city, for we find him filling the presidential chair of the local Teachers' Association, being, perhaps, the youngest president that body has ever elected, with the single exception of Mr. T. J. Macnamara, who so ably occupied that position while master of a Bristol school. Mr. Dowding's position, however, is unique, in that he is the first assistant master on whom the choice of the Bristol teachers has fallen to be their president.

MR. W. L. DOWDING.

Those teachers who, in January last, were present at the Redcliffe Parish Rooms, heard his presidential address, and noticed his genial, business-like manner, his earnestness, his quiet dignity, and the ready way in which he dealt with every incident and emergency of the meeting, agreed that the Association's choice had fallen on the right man to be a leader of his fellows. The address itself was studiously moderate in tone, deliberately and eloquently delivered in good and well-chosen language, yet from beginning to end displaying the true Unionist ring. Although Mr. Dowding thus occupies a prominent place among the Bristol teachers, we found him by no means eager to talk of himself. We found means, however, to obtain the following particulars relating to his personal career: Born in Bristol in 1866, he has passed through schools of the Bristol School Board as a scholar, pupil teacher, and assistant master. His apprenticeship as a pupil teacher was served in the Barton Hill Board School under the present master, Mr. Henry Gay. This school was for many years the largest and most important under the Bristol Board. We next find him at the Battersea Training College, having gained a First Class Queen's Scholarship, and here he retained a high position in the first class all through the two years of his college life, winning, at the same time, the good opinions of the officers and his fellow-students. Bristol then gained him as an assistant master, and for the past six years he has been engaged in the Anglesea Place Board School, Bristol, as a colleague of Mr. Harry Coward. Here as the senior assistant—a special post under the Bristol Board—he has won the very highest praise from Mr. Coward and the managers as well as the love and esteem of the scholars. His attainments also obtained for him the post of lecturer in the Board's evening classes for pupil teachers, a position he held for two years, until the beginning of the present year, when a day centre was established. We have reason to know from the pupil teachers themselves that the work Mr. Dowding did for them was of a very high order, and gained for him the esteem and affection both of the pupils and his colleagues at the centre.

In Union matters Mr. Dowding soon came to the front. In 1892 he was elected on the Committee of the local Association, for three years worked as supervisor of a district, and in 1895 was elected vice-president, which led to his becoming the president at the beginning of the present year. We find that in the Board Teachers' Association he has been on the Committee since 1892, having been secretary for four years and now being the vice-president.

In the Assistants' Association, we notice that he filled the president's chair during 1895 and has been continuously an active member of the Committee since 1892.

Neither is Mr. Dowding unknown outside Bristol, for we find him a representative at the Leeds N.U.T. Conference in 1892 and the famous Brighton one of last Easter, as well as at the Assistants' Conferences of Sheffield and Nottingham.

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COURSE 'B' IN ARITHMETIC.

A COMPLETE SYLLABUS FOR A YEAR, IN MONTHLY SECTIONS, WITH TESTS.

BY B. ELDERKIN,

Model School, Westminster Training College.

For Introductory Notice and First Month see February number of PRACTICAL TEACHER, 1896.

STANDARD I.

Syllabus—11th Month.

(*a*) Revision of rules.

(*b*) Simple problems in first three rules.

(*c*) Pence tables to 60 pence.

Test.

1. Find difference between 39 and 75.

2. What number would be six times as great as 15?

3. Find the half of 76; the third of 75; and the fourth of 96.

4. There were 13 sheep in one fold, 15 in another, 65 in another. If 5 were killed out of each fold, how many were left?

STANDARD II.

Syllabus—11th Month.

(*a*) Revise all rules (Standards I. and II.).

(*b*) Problems on first three rules.

Test.

1. A grocer took 10s. 9½d. on Monday, 15s. 7d. on Tuesday, 13s. 6d. on Wednesday, 14s. 10½d. on Thursday, 8s. 7¾d. on Friday, and on Saturday as much as Thursday and Friday put together; what did he take in the week?

2. What would 7 times 18s. 6½d. be?

3. Take 365 from 501.

4. A coat cost 12s. 6d., a vest 5s. 8d., and trousers 10s. 9d. What would 5 such suits cost?

STANDARD III.

Syllabus—11th Month.

(*a*) Revise rules.

(*b*) Problems in money.

(*c*) Learn tables of weight and time for Standard IV.

Test.

1. If a man spent 175 shillings, 276 pence, 3 half crowns, and seven half sovereigns out of £15, how much would be left?

2. What would 7 loads of coal cost at £7 15s. 10d. per load?

3. 18s. 10¾d. ÷ 26.

4. A horse cost £13 10s., a cart half as much as the horse, and the harness half as much as the cart. Find the cost of the horse, cart, and harness together.

STANDARD IV.

Syllabus—11th Month.

(*a*) Revision of rules.

(*b*) Learn long and square measure.

(*c*) Problems on rules.

(*d*) Explanation only of metric tables of length and area.

Test.

1. Add together 3 tons 13 cwts., 5 tons 7 cwts. 3 qrs., 16 tons 19 lbs., and give your answer in lbs.

2. If a clock tick twice every second, how many times would it tick between 9 and 12 o'clock?

3. Multiply £14 13s. 6½d. by 29.

4. How many times could a quart bottle be filled from 9 galls. 2 qts.?

STANDARD V.

Syllabus—11th Month.

(*a*) Revise bills and practice.

(*b*) Simple problems.

(*c*) Learn metric table of area.

Test.

1. Find the total cost of—
   15 yards of calico at 3¾d. per yard.
   5½ ,, silk at 1s. 11½d. ,,
   9 ,, alpaca at 2s. 1½d. ,,
   3 dozen reels of cotton at ¾d. each.

2. Find by practice the cost of 275 sheep at £2 14s. 10d. each.

3. Find cost of 7 galls. 3 qts. 1 pt. at 5d. per qt.

4. How many times would a penny, which measures 1½ inches in circumference, turn round in running across a table 4 ft. 6 ins. wide?

STANDARD VI.

Syllabus—11th Month.

(*a*) Interest and proportion for revision.

(*b*) Mensuration of cubes.

(*c*) Compare metric and English tables of length and area.

Test.

1. Find the amount of £500 for 3 years 6 months at £2 7s. 6d. per cent. per annum.

2. If I spend 13 guineas in 5 weeks, and save £25 a year, what must be my quarterly income?

3. If a franc is worth 9¾d., how many francs could I get in exchange for £4 9s. 4½d.?

4. A cubical box is 3 ft. 6 in. long. If the box weigh 29 lbs. and a cubic foot of water weigh 1,000 ounces, what will be the total weight of the box when full of water?

STANDARD VII.

Syllabus—11th Month.

(*a*) Revise back rules together with averages and percentages.

(*b*) Reduction and simple examples in metric tables of length and area.

Test.

1. The average cost of 5 houses was £570. If one cost £565 and another £860, what was the average cost of the other three?

2. A grocer mixed 4 lbs. of tea at 2s. 6d. per lb., 5 lbs. at 1s. 10d., and 7 lbs. at 1s. 6d.; what percentage did he gain or lose by retailing the whole at 2s. per lb.?

3. Reduce $\frac{3}{11}$ of £3 6s. + ⅓ of ·0275 of £50 − ·27 of 7s. 6d. to the decimal of £5.

4. By selling a horse for £25 I lost 10 per cent; what ought I to have sold it for to gain 10 per cent.?

TESTS—ELEVENTH MONTH ANSWERS.

Standard I.—(1) 36; (2) 90; (3) 38, 25, 24; (4) 78.

Standard II.—(1) £4 6s. 10½d.; (2) £6 9s. 9½d.; (3) 13; (4) £7 4s. 7d.

Standard III.—(1) £1 4s. 6d.; (2) £54 10s. 10d.; (3) 8½ + 2; (4) £10 2s. 6d.

Standard IV.—(1) 56,103 lbs.; (2) 21,600 times; (3) £425 12s. 1½d.; (4) 38 times.

Standard V.—(1) £1 16s. 10d.; (2) £753 9s. 2d.; (3) 13s. 1½d.; (4) 36.

Standard VI.—(1) £541 11s. 3d.; (2) £41 14s. 9⅜d.; (3) 110; (4) 1 ton 4 cwt. 20 lbs. 11 oz.

Standard VII.—(1) £475; (2) gain 7$\frac{7}{10}$ per cent.; (3) ·2508; (4) £30 11s. 1½d.

A NEW AND ORIGINAL SCHOOL SONG in both Notations will appear in our next Number.

COMING MEN.

MR. W. L. DOWDING.

President, Bristol Teachers' Association; Vice-President, Bristol Board Teachers' Association; Ex-President, Bristol Certificated Assistant-Teachers' Association.

SOME years ago it was our good fortune to make the acquaintance of Mr. W. L. Dowding, who is now so well known in educational circles in the neighbourhood of Bristol. He has succeeded in winning his way to the front at a much younger age than is usual in our good old western city, for we find him filling the presidential chair of the local Teachers' Association, being, perhaps, the youngest president that body has ever elected, with the single exception of Mr. T. J. Macnamara, who so ably occupied that position while master of a Bristol school. Mr. Dowding's position, however, is unique, in that he is the first assistant master on whom the choice of the Bristol teachers has fallen to be their president.

MR. W. L. DOWDING.

Those teachers who, in January last, were present at the Redcliffe Parish Rooms, heard his presidential address, and noticed his genial, business-like manner, his earnestness, his quiet dignity, and the ready way in which he dealt with every incident and emergency of the meeting, agreed that the Association's choice had fallen on the right man to be a leader of his fellows. The address itself was studiously moderate in tone, deliberately and eloquently delivered in good and well-chosen language, yet from beginning to end displaying the true Unionist ring. Although Mr. Dowding thus occupies a prominent place among the Bristol teachers, we found him by no means eager to talk of himself. We found means, however, to obtain the following particulars relating to his personal career: Born in Bristol in 1866, he has passed through schools of the Bristol School Board as a scholar, pupil teacher, and assistant master. His apprenticeship as a pupil teacher was served in the Barton Hill Board School under the present master, Mr. Henry Gay. This school was for many years the largest and most important under the Bristol Board. We next find him at the Battersea Training College, having gained a First Class Queen's Scholarship, and here he retained a high position in the first class all through the two years of his college life, winning, at the same time, the good opinions of the officers and his fellow-students. Bristol then gained him as an assistant master, and for the past six years he has been engaged in the Anglesea Place Board School, Bristol, as a colleague of Mr. Harry Coward. Here as the senior assistant—a special post under the Bristol Board—he has won the very highest praise from Mr. Coward and the managers as well as the love and esteem of the scholars. His attainments also obtained for him the post of lecturer in the Board's evening classes for pupil teachers, a position he held for two years, until the beginning of the present year, when a day centre was established. We have reason to know from the pupil teachers themselves that the work Mr. Dowding did for them was of a very high order, and gained for him the esteem and affection both of the pupils and his colleagues at the centre.

In Union matters Mr. Dowding soon came to the front. In 1892 he was elected on the Committee of the local Association, for three years worked as supervisor of a district, and in 1895 was elected vice-president, which led to his becoming the president at the beginning of the present year. We find that in the Board Teachers' Association he has been on the Committee since 1892, having been secretary for four years and now being the vice-president.

In the Assistants' Association, we notice that he filled the president's chair during 1895 and has been continuously an active member of the Committee since 1892.

Neither is Mr. Dowding unknown outside Bristol, for we find him a representative at the Leeds N.U.T. Conference in 1892 and the famous Brighton one of last Easter, as well as at the Assistants' Conferences of Sheffield and Nottingham.

In the course of conversation *re* the position and aims of the assistants, Mr. Dowding said: 'The disadvantages under which assistant teachers labour may be largely traced to a general misapprehension existing among the public as to the qualifications and position of a certificated assistant. I have been told that there is a widespread fallacy, by which the average parent mis-ranks the qualified man or woman, teaching in the class-room the child of to-

day, with the boy or girl who, as pupil teacher under an almost obsolete system, did 'prentice-work when this parent was himself at school. I have heard of managers of schools whose demeanour is suggestive of the same error. Is it not to be feared, too, that sometimes the principal teacher administers the affairs of the school with calculations on the functions of staff indicative of the same dark state of mind? The extremely happy and cordial relations existing in my own school between the head master, Mr. Harry Coward, and all the members of the staff, however, prevent me from personally knowing much about this phase of the question. Much apathy has been shown in Union matters by assistants. They have been conspicuous by their absence from meetings where matters vitally affecting their interests were being discussed. They are now getting to be more alive to the necessity of attending meetings, even at the sacrifice of giving up some share of out-door enjoyments and other attractions.'

'Do you believe in the policy and work of the Federation of Assistant Teachers?' we enquired.

'Yes, I believe that with its present constitution and policy the Federation is justly entitled to the confidence of all certificated teachers. I certainly think, too, that the more close its connection with the greater organization, the N.U.T., the greater its chance of real success. I strongly disagree with any unnecessary line of cleavage in our ranks, and must say that, personally, I should like to see membership of the N.U.T. an absolute condition of membership of the Federation. At the outset I went with that by no means inconsiderable section who regarded with mistrust the formation of a separate organization, and think that the moderate policy of that time was not without its beneficial effect upoh the character of the body which was eventually formed.'

On another occasion Mr. Dowding gave us the opportunity of seeing something of his work at the Anglesea Place Schools. We found him hard at work with an upper standard, giving a geography lesson. This finished—an excellent lesson—we had some conversation on school work generally, and we found that here, as outside in Association work, we were dealing with a shrewd, up-to-date, well-qualified practitioner. We noticed a good library in the school, of which, the head master informed us, Mr. Dowding took the entire charge, and was spreading a love of good reading among a considerable number of the boys. Throughout the class of which Mr. Dowding had the charge we were conscious of the good effects produced by the conscientious painstaking teacher. Clean exercise-books, neat writing, orderly habits, and the respectful demeanour of the boys bore witness to the good influence exerted by the teacher.

We left Mr. Dowding with even a higher opinion of him than we had previously formed, and we congratulate Bristol's teachers on having been fortunate enough to single out from our younger men one so well qualified to uphold the dignity and honour of the profession. We venture to forecast that Mr. Dowding is one of those of whom more will be heard in the future.

NEW PROBLEMS IN ARITHMETIC.

BY T. B. ELLERY, F.R.G.S.
Ex-President of the National Union of Teachers.

THIRD SERIES.

STANDARD V.

Every exercise here given will suggest to the practical teacher many others of the same kind. May I say, too, that the blackboard should be freely used in the solution of these problems.

Some of the exercises may, perhaps, be considered too difficult for the particular Standard in connexion with which they are set, but they are given for the purposes of blackboard lessons and as a preparation for more advanced work.

Each exercise should be written on the board, read by the teacher, and then by the class. Every effort should be made to encourage the children to think, and to this end preliminary mental practice should be given before any one problem is attempted.

A.

1. A girl's weekly earnings amount to 13s. 6d. She saves $\frac{1}{9}$ of this sum. In how many weeks will she save twenty-seven guineas?

2. A man's annual income is a hundred and eighteen guineas. Each year he saves £32 5s. 6d., and pays £25 for rent. The rest he spends in food, etc. What does he spend weekly in food, etc.?

3. A man's wages are ninety guineas a year of 365 days. What, at this rate, will he receive from June 1st to August 12th (both dates inclusive)?

4. I sold coal at a guinea a ton, which was 3s. 6d. a ton more than I gave for it. If I spent £21 in all, how many tons did I buy?

5. A gentleman paid 50s. for a number of collars at 9½d. each, and received 2s. 6d. change. How many dozen collars did he buy?

6. A milkman buys 16 gallons of milk every day at 10d. a gallon, and sells it at a gain of a penny a quart. What does he receive in the month of November?

7. How many 7-lb. parcels of tea can I buy with £26 5s., the tea costing 1s. 10½d. a lb.?

8. How many eggs at 16 for a shilling can be bought with the money realised by the sale of 2,500 oranges at 20 for a shilling?

9. An oilman bought 80 gallons of oil, and sold it at 9d. a gallon, gaining 3d. on every 2 gallons. What did he pay for the oil in the first place?

10. A and B have together 17s. 6d., A and C have together 17s. 2d., and B and C have together 16s. Altogether they have £1 5s. 4d. How much has each?

11. A fruiterer bought a thousand oranges at a shilling a score. 40 of these became unfit for sale and he sold the rest at the rate of 9d. a dozen. Find his gain.

12. A fishmonger buys fish at 6 for 1s. 9d., and sells them at 6½d. each, gaining on the whole transaction two guineas. How many does he sell?

13. A man's hat cost three times as much as a boy's, and 8 men's hats cost £2 4s. Find the cost of a dozen boys' hats.

14. A rate of 2¼d. in the £ is required to raise a sum of £682 16s. 9d. Find the rateable value of the town.

15. I buy a cask of sugar weighing (cask and sugar) 1½ cwt. for 15s. At what price per lb. must I sell the sugar so as to gain 5s. by the sale? (The cask weighs 8 lb.)

B.

16. A 4d. loaf weighs 3 lb., when wheat is at 30s. a quarter. What will it weigh when wheat is 6s. a quarter dearer?

17. How many apples at 5 for 2d. can be bought with the money obtained from the sale of 50 gallons of milk at 3½d. a quart?

18. 3 cows cost the same as 4 horses. 6 horses cost the same as 30 sheep. Find the cost of a cow, a sheep fetching £2.

19. I buy 2 qr. 24 lb. of tea at the rate of 4 lb. for 7s. 6d., and sell it at 2¼d. an ounce. Find my gain.

20. If a man buy 20 boxes of eggs, each containing 6 score, for five guineas, and sell them at 10 for 8d. What is his gain?

21. A grocer buys a chest of tea weighing ½ cwt. for £3 10s. 16 lb. become spoiled. At what price per lb. must he sell the remainder so as to gain a sovereign on the transaction?

22. A man and his wife together earn 36s. a week, the man earning 3 times as much as the wife. In how many weeks will the man earn £40 10s.?

23. A grocer bought 12 cwt. of cheese at 6½d. a lb., and paid at the rate of ¼d. a lb. for carriage, etc. He sold the whole at the rate of 3 lb. for half-a-crown. Find his gain.

24. A gives 7s. 6d. as often as B gives a crown. A gives altogether £9. How much does B give?

25. The sum of £29 18s. was divided among 16 men and a number of women. Each of the men received 18s., and each of the women half-a-crown less than that sum. How many women were there?

26. A grocer sold 5 chests of tea, each containing ¾ cwt., at 2s. 4d. a lb., and on the whole sale gained £8 15s. What did 3 lb. of the tea cost him?

27. A man sold ⅔ of his apples to one man, and ⅗ to another, and had 25 left. How many had he at first?

28. Tom walks at the rate of 3½ miles in 1 hr. 10 min., and Fred at the rate of 4⅜ miles in 1 hr. 15 min. How much farther than Tom does Fred walk in 3¾ hr.?

29. I spent £2 10s. 6d. on apples at 6 a penny. Of these 153 apples became unfit for sale, and I sold the rest at 9 for 2d. What did I gain?

30. If ⅓ of an estate be worth three hundred and sixty guineas, find the value of ⅙ of it.

C.

31. 5 lb. of tea cost as much as 70 lb. of sugar. If ½ cwt. sugar cost 9s. 4d., find cost of 1 lb. of tea.

32. If 2 cwt. 2 qr. of goods be conveyed 60 miles for 6s. 8d., what would be paid for the carriage of goods 2 qr. 14 lb. heavier than the former for half the distance?

33. Divide £13 10s. among A, B, and C, giving C 30s. less than is given to either A or B.

34. A man buys tea at 1s. 8d. a lb., and sells it at 2s. 4d., and he buys coffee at 1s. 2d., and sells it at 1s. 5d. He sells an equal number of lb. of each, and on the whole sale gains £5 10s. How many lb. of tea did he sell?

35. If ¾ cwt. of tea cost the same as 1 cwt. 3 qr. 20 lb. of cheese, find the cost of 1 lb. of tea, the cheese being sold at the rate of 7s. for a dozen lb.

36. I bought knives at 12 for 8s., and sold them at 8 for 12s. How many dozen must I sell to gain £5?

37. If a man earn half-a-crown in the same time that his son earns 6d., and together they earn 18s. in a day, find the weekly earnings of each. (1 week = 6 days.)

38. The sum of £19 5s. is contained in a bag. Of this £2 10s. is in gold and £3 5s. in coppers. The rest is made up of an equal number of florins and half-crowns. How many silver coins are there in the bag?

39. A man bought 18 bus. 2 pk. of potatoes for £1 10s. One-fourth of the whole became unfit for sale, and he sold the rest at 3½d. a gallon. What did he gain or lose?

40. A clock gains 9 min. every 24 hr. It is put right at 1.20 p.m. on Monday. What time will it indicate at noon on Saturday?

41. ¼ of an estate was left to A, and the remainder to B. The difference in the value of their receipts was thirteen hundred guineas. Find the value of A's share.

42. A can do a piece of work in 3 days, and B in 6 days. How long would they take working together?

43. 8 men and 14 women earn altogether £18 15s. in a week of 6 days. Find the daily earnings of a man, a woman earning half as much as a man.

44. At 7.45 p.m. a hall was ¾ full, and at 8 o'clock 210 people were present, and the hall was ⅞ full. How many came between 7.45 and 8 o'clock?

45. A fruiterer bought 2,000 oranges at 24 for a shilling, and 1,000 at 9d. a dozen, and sells the whole at a gain of £3 2s. 6d. Find selling price of an orange, taking one with another.

ANSWERS.

1. 252 weeks
2. £1 5s. 7½d.
3. £18 18s.
4. 24 tons
5. 5 dozen collars
6. £28
7. 40 7-lb. parcels
8. 2,000 eggs
9. £2 10s.
10. A, 9s. 4d.; B, 8s. 2d.; C, 7s. 10d.
11. 10s.
12. 168 fish
13. £1 2s.
14. £72,836
15. 1½d. per lb.
16. 2½ lb.
17. 1,750 apples
18. £13 6s. 8d.
19. £4 10s.
20. £2 15s.
21. 2s. 3d.
22. 30 weeks
23. £18 4s.
24. £6
25. 20 women
26. 5s 9d.
27. 225 apples
28. 3 miles
29. 14s.
30. £2,520
31. 2s. 4d.
32. 4s. 2d.
33. A, £5; B, £5; C, £3 10s.
34. 120 lb. tea
35. 1s. 6d.
36. 10 dozen knives
37. Son, 18s.; Father, £4 10s.
38. 120 silver coins
39. Lost 3s. 7½d.
40. 44 min. 30 sec. past noon
41. £682 10s.
42. 2 days
43. 4s. 2d.
44. 30 people
45. ⅝d.

In the West Countree.

[Continued from January Issue, page 336.]

No. 7.—FAREWELL CHORUS.

For - - tune give..... thee por - - - tion rare;.....
mf cres.
f
Smile on thy path, and glad..... thy heart With
fa - - - vour that shall ne'er de - - part, With
p
fa - - - vour that..... shall ne'er de - - part. Re - -
dim.
p
- - mem - - ber, where - - - so - - e'er you stray, The

Fare - -
mp
friends that wish..... you well..... to - - day. Fare -
cres.
mp
- - well,.....
- - well, fare - well, dear Jo - - - nath! take..... with thee The
f
dim.
love..... of all..... this com - - pa - - ny.....
cres.
f
Oh, may thy way be ev - - - er fair, And
cres.
For - - tune give..... thee por - - tion rare, And

Fare - well!.....
dim. mf
mf
For - - tune give..... thee por - - tion rare. Dear.....
..... Fare - well!..... Fare - well!.....
p p pp
Jo - nath, Dear Jo - nath, Dear Jo - nath, fare - well!.....
p p pp

Sir Reg.:

Come! cease this puling. Send us on our way
With lusty strains that speak of glorious fray.
Pluck up, stout heart, and pipe a merry strain;
A truce to sadness! We shall meet again.

(SIR REG. *draws sword and leads Chorus.*)

No. 8.—CHORUS.

f
As we march a - way, in brave ar - ray, The peo - ple flock a -
mp cres.
- round; Our ban - ners fly, we ne'er say die, To the stir - ring trum - pet sound! 'Tis a
ff

mer - ry life of love and strife, We scorn death's grim de - cree; We
mf
f
know no fear, though bat - tle's near— A..... sol - dier's life for me! 'Tis a
Gradually softer to the end, as they march off the stage.
mer - ry life of love and strife, We scorn death's grim de - cree; We
Gradually softer to the end, as they march off the stage.
dim.
know no fear, tho' bat - tle's near— A..... sol - dier's life for me!
pp

(Villagers cheer as Sir Reg. and Jonath depart.)

[CURTAIN.—*End of* ACT I.

ACT II.

Scene: Outside Ilminster Jail (after the Battle of Sedgemoor). *(Guards lolling on benches, near door of jail.)*

No. 9.—CHORUS OF SOLDIERS.

Animato.
f
Sol - dier lads, come fill up the can, And pipe a lus - ty strain! The bat - tle's done, the
mf A truce to the bu - gle's
bat - tle's won, And swords are sheath'd a - gain. A truce to the
f
mf
shrill a - larm,
f
shrill a - larm, To the drum's a - rous - ing rat - tle; To cut and thrust, to the blood - red dust Of the
f
FINE.
pp
p
storm in the roar - ing bat - tle. Oh, some that sped Shall fight no more, Their
FINE.
pp
p

(At end of Chorus, batch of chained prisoners, including Reuben and several villagers from Bishopstoke, marched across stage by escort and lodged in the prison).

1st Soldier:

Poor souls! poor souls! Where is their Monmouth now?

2nd Soldier:

Faith, I should say, fast scudding 'fore the wind
In some fleet lugger for the Dutchman's land.

1st Soldier:

Well, this I know. If James lay hand on him
His head will fall.

2nd Soldier:

Aye, little doubt of that.
What witchcraft was it fooled this smock-frocked drove
To oppose with pitchforks, mattocks, scythes, and flails,
The likes of us, the Royal soldiery?

1st Soldier:

Nay, nay, they fought like Romans, everyone!
But for the trench that cleft the moor in twain
And held them off, while our good cannon roared,
It had gone ill, my lad, with thee and me.
Never despise thine enemy, good youth.

2nd Soldier:

There's some should get advancement. Is't not so?

1st Soldier:

Aye, Jonath's pretty safe. A lucky dog!
For twenty hard fought years I've won a sword,
Yet never on my stroke has fortune smiled.
Still, Jonath is a doughty lad, and I
Can bear no envy when true worth succeeds.

2nd Soldier:

Nor I; nor I. See, here the captain comes.

(Enter Sir Reg., L.)

Sir Reg.:

How many rebels have ye in the clink?

1st Soldier:

An hundred, Captain, where there's breathing space
For scarce a score.

Sir Reg.:

Well, well, their shrift is short.
Yon grove of gibbets will be black ere night
With dangling corpses, food for carrion crows.
The Judge draws nigh. Where's Trooper Jonath Inch?
Go send him hither.

(Exit Soldier, R.)

(Aside.)

Rough work I've seen, but this, the aftermath
Of Sedgemoor's reddened harvest, sickens me.
Faith, butchers and not soldiers, should be hired
To do the rest. The king's a heart of flint;

(Enter Jonathan.)

And Jefferies, his minion, like a ghoul
Gloats on the ghastly mischief that he wreaks.
Like a foul plague he stalks across the shire,
And grinning death waits on his wanton nod.
Oh, 'tis a fiend inhuman!
Hither, lad. *(Jonathan advances.)*
Give me thy hand. I owe my life to thee,
But for thy skilful thrust, that miner's pick
Had let the daylight into my brain-pan.

Jonath:

'Tis nothing, captain. Say no more, I beg.

Sir Reg.:

Dost deem ***my*** life as nothing? Nay, my lad,
'Tis all the world to me. I owe thee much.
"Sergeant Jonath Inch," I do salute thee.
My prophecy, on thy enlistment made,
Begins to work its course. Go on, my lad,
The epaulettes await thee.

Jonath:

Proud I was
To be the instrument to save thy life;
But good Sir Reginald, this honour new
Doth ill befit my less than small deserts.
Yet do I thank thee, and I trust to prove
A firmer title to my sergeancy
Than thy esteemèd favour.

Sir Reg.:

Guard, turn out!

(*Enter Soldiers.*)

My lads, take note that Trooper Jonath Inch
For valour on the battlefield hath won
Advancement. Henceforth, Sergeant Jonath Inch.

(*Exit Sir Reginald,* R.)

1st Soldier:

It is his due. What say you, lads? Three cheers
For our new sergeant. Hip, hurrah! hurrah!

Jonath:

I thank you comrades from a grateful heart.
I would I had the wit to clothe my thoughts
In gracious words.

1st Soldier:

Nay, *sing* thy thanks, and we
Will pipe in merry chorus lustily.

No. 10.—SONG (Jonath) AND CHORUS.

Allegretto. mf
p
f
1. I'll sing you a dit - ty Of a wag from the ci - ty, Who rode a - way On a
2. He met Ro - bin Gray As he stopp'd by the way To wa - ter his horse, His
3. "See here, you clown!" Said the wag from the town, "Two hor - ses I see— One's for
4. "A horse - chest - nut," He said to his butt, "Is a chest - nut horse, You
5. "I'll take this, please," Said Ro - bin, the tease, As he jump'd on the back Of the
mf
p
f
mf
p
1. sum - mer's day To take his plea - sure In right mer - ry mea - sure, And prac - tise his
2. chest - nut horse. He pick'd up a nut— A horse - chest - nut, And thus he did
3. thee, and one's for me." "How's that?" said the clown To the wag from the town; "I on - ly see
4. see, of course; So here are two, And one's for you." "Oh, thanks," said the
5. chest - nut hack, And gal - lop'd a - way With - out "Yea" or "Nay," While the wit did
mf
p
rall.
f
f
a tempo.
1. wit, This el - e - gant cit, From the town..... O, from the town.....
2. say, This wag by the way, From the town..... O, from the town.....
3. one, That you came up - on From the town..... O, from the town.....
4. clown To the wag from the town, From the town..... O, from the town.....
5. stand, With the nut in his hand, Look - ing down..... O, look - ing down.....
Sing Hey, der - ry
colla voce.
f
f
a tempo.

CHORUS.

down, For Ro - bin the clown, Who did ve - ry brown This wag from the town! Sing
f
f
p
Hey, der - ry down, For Ro - bin the clown, Who did ve - ry brown This wag from the town!

[*Exit Soldiers, cheering Jonath*, R., *Sentry remains.*

(*Enter Peggy and Prudence*, L.)

Peggy:
This is the place, dear mistress. Come, be brave.

Prudence:
Oh, Peggy, doth their live in all this land
One steeped so far in misery as I?
Perchance, my aged sire lies pent within
These iron bars, panting the weary days,
Till foul contagion smite with fever'd breath
Or cruel men snap short his thin-spun life.
Why did he venture forth in his old age
To strike a blow in this ill-fated strife?
Oh! it is terrible! What shall I do?
My heart suspends its beat, and every nerve
Throbs with a torment of unceasing pain.
Good soldier, tell me, dost thou know, if here
My father is confined?

Sentry:
Eh! What! Why, girl,
How should I know thy father? Dost thou think
I am acquaint with every rebel dog
Within the shire?

Prudence:
A frail but steadfast man,
With whitened locks, a keen and piercing eye,
Solemn in converse, and in raiment sad.

Soldier:
Why, hang thee, girl, I've something else to do
Than scan the features of yon crop-eared Whigs.
A pestilence upon you! What's his name?

Peggy:
In sooth, his name is Master Reuben Inch.

Soldier (referring to paper):
Ay, *he* is here.

Prudence:
Soldier, I'll give thee all—
My little store of gold, if for a space
I may hold converse with my prison'd sire.

Soldier:
Wouldst bribe me, girl? Away with thee, I say.

Prudence (wringing her hands in grief):
What shall I do?

Soldier:
Why, get an order, girl,
From General Churchill.

Prudence:
Whither doth he dwell?

Soldier:
He lies up yonder at the Golden Fleece.

Prudence:
I will go see this Gen'ral, and entreat
His clemency upon my bended knee.
Oh, if his heart be human and kind heav'n
Grant me the power, I'll beg his precious life
With all the fervency of filial love.
Stay here, dear Peggy; I shall soon return.

Peggy:
Good wishes in abundance go with you. (*Exit Prudence*, L.)

(*Enter Jonath and Soldiers*, R. *Sentry relieved.*)

Peggy (eagerly watching Jonath):
Why, sure, 'tis Jonath. Master Jonathan, don't you know me? Peggy, your old nurse!

Jonath:
Peggy, you here?

Peggy:
Yes, Master Jonath. Law, how you've grown. To think that only a year or two ago I was dandling you on my knee and feeding you out of a spoon, and now you are a great soldier, with three stripes on your arm and a big sword clanking at your side. Oh, Master Jonath, it's a feast for sore eyes to see you again. Stand still, and let me have my fill of looking at you. (*Walks round him*). Oh, how I'd like to show you round Bishopstoke. How the lads and lasses would stare. But, am I awake or only dreaming? Are you real, or shall you fade away when I rub my eyes?

Jonath:
Well, Peg, rub thy eyes and try.

Peggy (rubbing her eyes):
No! there you are still! Law, Master Jonath, how proud I am of you. Are you a general?

Jonath:
Not quite, Peg. I'm only a sergeant.

Peggy:
Oh, but you look splendid enough for a general, or for half-a-dozen generals, if it comes to that. But here, I am running on like the clack of a mill-wheel and all the while forgetting about the poor Master and Mistress Prue.

Jonath:
Why, what of them? Oh, Peggy, don't say they are here!

Peggy:
Alas! 'tis true. Soon after you left, Master Tyler came to Bishopstoke with news of Monmouth's landing. Master took down his rusty sword from over the mantel-piece and without more ado sped to Taunton Town. Now he is locked up in the clink for bearing arms against the King, and Mistress Prue, like one distraught, has gone to beg his life from the General.

Jonath:
Ah, no! My father, one of Monmouth's men!
You tear my heart in twain. His doom is sealed.
Vain, vain, poor Prue's fond quest; no hope lies there.
Jefferies, the Judge, whose coming strikes a thrill
Of chilling terror through the stoutest frame,
Is hastening here to try the prisoners.

His heart is marble. Pity moves him not :
Mercy he scorns, and death he sows broadcast
With mocking taunt and foul, envenom'd jeer—
What shall I do? My captain will I seek
And beg his aid. He is right powerful,
And it may chance that, out of gratitude,
He will bestir himself to find a way
To cut the meshes of the Law's close net.
Come, Peggy, come. (*Exit Jonath' and Peggy*, R.)

Prudence: (*Enter Prudence*, L.)
'Tis all in vain. No one will heed my cry.
The General will not see me. Soldiers rude
Thrust me again into the roaring street
With oaths and blows. I begged them, on my knee.
They only mocked and gibed me in my grief.
Ah me! I can do nothing. Like a straw
Before the wind, I wander here and there
With no effect. Three little months ago
In calm and innocence our days sped by,
Like some fair stream, that glides towards the sea
And makes on murmuring music as it flows.
O that those days, those sweet and bygone days,
Could come again, to linger till I die!

No. 11.—SONG (Prudence).

mf
1. I dream'd a dream, and lo! the cloud of war Roll'd like a mist a -
2. The hedge-rows sweet, with jes - sa - mine en - twined, Scent - ed the si - lent
Adagio espressivo.
p
mf cres.
p
mf
way; And once a - gain my old sweet home I saw In peace at close of day. The
air; And calm and peace spread o'er my fe-ver'd mind, And made a hea - ven there. Faint
p
p
pp
mp
blue-wreath'd smoke curl'd up in-to the sky, The birds, in home-ward flight,..... Whisper'd in gra - titude their
rang the cur - few from the i-vied tower, Me - lo - dious lul - la - by! Oh, come a - gain, sweet
p
p dim. e rall.
ev - 'ning song, Day darken'd in - to night,..... Day darken'd in - to night.
vis - ion of an hour, To lin - ger till I die,..... To lin - ger till I die.
p
colla voce.

(*Enter Jonath and Peggy.*, R.)

Jonath:

Sister, dear sister! pluck up heart, be brave;
I serve the King, and have the favour won
Of my commander, who has given his word
To use his best endeavours that our sire
May 'scape the penalty the Law demands.

Prudence:

Oh, dearest brother! Kindly Providence
Hath sent thee here to be my stalwart aid.
A courage new hath entered my sad heart:
I feel, I know not why, that one bright ray
Illumines now the black and dreary night
Of our great sorrow.

Jonath:

Grant it may be so.

(*Trumpet heard without.*)

Prudence:

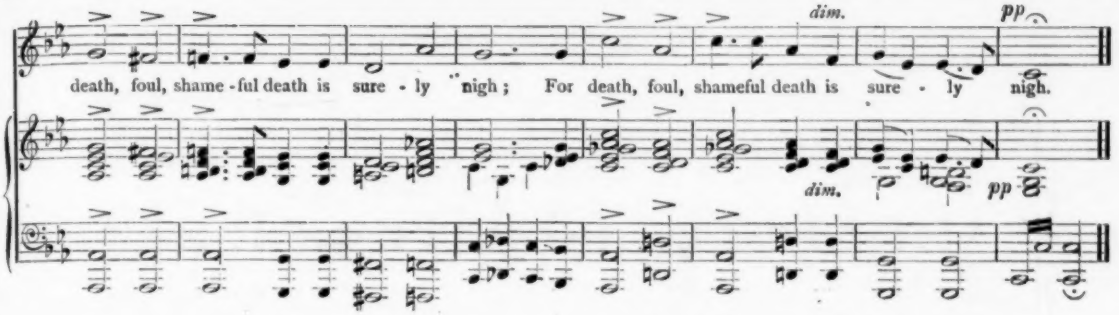
What means this stir?

Jonath:

Alas! The Judge doth come.

(*Enter Townsfolk.*)

No. 12.—CHORUS.



(*Enter Sir Reg.*, R.)

Sir Reg:
Jonath, my lad. I've done my best, and though
Hope is not dead, thy father must be tried
With all the other prisoners. Lead them forth.

(*Prisoners marched on to stage.*)

Reuben (*to his fellow-prisoners*):
Nay, be not downcast. These, our earthly foes,
Can only harm this tenement of clay;
Our souls immortal lie within His hand,
Safe from their stroke. Be joyful, neighbours all,
A martyr's crown awaits you in the skies.

Jonath (*pulling his father by the sleeve*):
Be silent, father, speak no word, I beg,
And it may chance thou shalt again be free.

Reuben:
What, art thou here? *Thou*, my degenerate son,
Enrolled within the base oppressor's ranks,
Turning thy hireling sword 'gainst Truth and Faith.
Away! away! Nought will I speak to thee.

(*Jonathan stricken with grief. Prisoners marched off.*, L. *Jonathan and the soldiers go with them as escort.*)

Sir Reg. (*to Prudence*):
Nay, weep not, lady. 'Tis the blackest hour
That comes before the day. All may be well—
See, here comes Lady Churchill. Speak to her;
She is a gentle woman, and perchance,
Thy youth and loneliness will touch her heart.

(*Exit Sir Reg.*, R.)

Prudence: (*Enter Lady Churchill.*, R.)
They say, sweet lady, that a pitying heart
Throbs warm within thy breast. Oh, if 'tis true,
Grant me a moment to pour forth my woes.
My white-haired sire took arms against the King
And now doth stand before yon judgment-seat
To answer for it. Weak and ill is he;
His feet are on the verge of life's domain;
His years are many, and the natural end
Must soon arrive. Oh, save his feeble life.
Beg them to let him live his few, short days
Within the shelter of his peaceful home.
I'll be his surety. Never, never more
Shall he offend against Authority.

Lady Churchill:
Examples must be made, and peace must reign
In this sad realm, though many hearts should break.

Prudence:
Oh, say not so, dear lady. 'Tis a speech
Thy brain and not thy woman's heart dictates.
If they should hang him—that black, fatal hour
Would be my last. My brother, lady, fought
On Sedgemoor's fatal field 'gainst Monmouth's power:
Father and son strove on opposing sides.
Annul the sire's rebellion with the faith
Of loyal son, and I will pray for thee
Till death shall close mine eyelids in the grave.
No hour shall pass without a memory
Of thy sweet mercy. Spare, oh spare his life,
And I will be thy slave for evermore.
Or if that may not be, I'll take his place
Beneath the gallows' tree, and bless the power
That lets me do it. Pity, pity me,
A motherless, lone girl, whose riven heart
Cries out in agony.

Lady Churchill:
Not mine the power
To free thy sire. Dread is the Law's strong arm,
And that enfolds him. But I pity thee,
And in compassion will bestir myself;
But I can promise nothing. Fare thee well!

Prudence:
Save but his life, and this heart's ruddy drops
I'll gladly spill for thee.

(*Exit Lady Churchill.*, L.)

Reuben: (*Enter Townsfolk, Soldiers, and Prisoners.*)
My daughter, here we make our sad farewells.
In mercy, child, we are not given to death
With cord and halter. Yonder wicked man,
Who one day shall appear with crime-stained soul
Before the bar of Heaven's high judgment-seat,
Sends us afar, across the watery waste,
To swelter in a land of pestilence,
Where torment's whip, plied by inhuman hands,
Shall make the laggard Death a welcome guest.
So let us say farewell. Nay, weep not so;
The end must come. They but anticipate
A few short years. Farewell, my dear loved child!

Prudence (*clinging to him*):
I'll go with thee, aye, to the bounds of earth.

Sir Reg.: (*Enter Sir Reg. and Jonath.*, L.)
'Tis true. This batch are all assigned
To Lady Churchill. She may deal with them
As unto her seems fit. See, here she comes.

Jonath: (*Enter Lady Churchill.*, L.)
Lady, look on me. Young, lusty, strong,
With years of toil before me. This old man,
Feeble and bowed with age, thy prisoner is.
Oh, let me take his place. In pity, hear.
They'll give thee thrice the weight of gold for me
That he will fetch, in open market sold.
Fill thou thy purse, and bless me with a boon
Of priceless value.

Reuben:
Jonathan, my son,
I have misjudged thee. Thus dost thou repay
Harsh words and cruel banishment. Nay, nay!
Thou shalt not sacrifice thy days of strength
To husband out my flickering flame of life.
But, still, I bless thee, and I do entreat
My son's forgiveness.

Jonath:
Not so, father mine;
There's nothing to forgive.

Lady Churchill:
Poor prisoners. I pity your sad lot,
And do rejoice that in my hands the knot
Of your captivity unloosed may be.
Your ransom I will pay. Lo! you are free—
Free, every one, to wend your homeward way;
Free to escape from these red scenes of fray,
And once again to know the wealth of joy
That honest labour gives without alloy.

(*Townsfolk cheer, and soldiers remove the prisoners' chains.*)

Reuben:
Right noble lady! If our tongues wax faint,
Our hearts throb in delirious thankfulness.
Words come not, but these tears of blessedness
Attest the gratitude that knows no end.
The mercy thou hast shown our stricken lives
Shall be thy lot when thou shalt need its aid.
May joy smile on thee until life depart,
And wreathe all blessings round thy tender heart!

No. 13.—FINAL CHORUS.

Allegro con brio.
Light has shone from out the
8ves.
dark-ness, Glorious light of li - ber - ty; Light that reaves the cloud of sor - row In - to gleaming ec - sta -
- sy; Light that reaves the cloud of sor - row In - to gleam-ing ec - sta - sy.
Migh-ty Judge, thy power a - vail - eth, Working in a wo - man's heart, While the day of life re -
- main-eth, Grate-ful love shall ne'er de - part, Grate-ful love shall ne'er de - part; While the day of life re -
cres.

- main-eth, Grate-ful love shall ne'er de - part; While the day of life re - main-eth, Grate-ful love shall ne'er de-
cres.
rall.
Grate - ful love shall ne'er de - part.
- part, Grate - ful love..... shall ne'er..... de - part. Light has shone from out the
f a tempo.
dark-ness, Glo-rious light of li - ber - ty; Light that reaves the cloud of sor - row In - to gleam-ing ec - sta -
- sy; Light that reaves the cloud of sor - row In - to gleam-ing ec - sta - sy: Glo-rious
Glo-rious light,.....
..... glo-rious light,.....
light, glo-rious light, Glorious light of li - - - ber - ty!

[TABLEAU AND CURTAIN.

NOTES AND NOTIONS.

BY T. B. ELLERY,

Ex-President of the National Union of Teachers.

Exit Rate-Aid. As most of us expected, the Government has decided that in the Bill shortly to be introduced to give further financial aid to schools, the relief will be in the nature of a *State Grant*. Personally, as I have said before in these columns, I see no just reason why Voluntary Schools should not share in the rates, given proper management. The existing unfair competition would then disappear, the work would be done under fair conditions, and there would be an end to much of the present 'Sweating.' But, everyone knows that if Voluntary Schools were permitted to share in the rates, a great political and religious warfare would begin at once, a battle that in all probability would last for years, during which time education, the child, and the teacher, would all suffer. 'Popular control,' as understood by the violent anti-Voluntaryist, will not be conceded by the Church. That much is certain.

It might be that Mr. Yoxall's suggested Round Table Conference would do something to bring about some sort of understanding, but it is extremely doubtful. The feeling is so bitter, the differences are so great, that a compromise seems out of the question. Rate-aid, therefore, for the time at any rate, disappears, and the Government hopes to escape a repetition of the experience of 1896 by introducing a modest little scheme which it thinks should offend nobody.

But I shall be very much surprised if a violent attack is not made on the Bill, whatever its provisions may be.

Mr. Balfour and Rate-Aid. After Mr. Balfour's speech to his Manchester constituents on January 9th there can be no doubt as to the course the Government will take. He said he knew that Lancashire in general and Manchester in particular, was the headquarters of the rate-aid movement. He was a Scotsman, and he came from a country where rates were habitually, almost invariably, employed for the support of denominational religious education. He, therefore, had no prejudices against the system, nor did he believe that in the abstract there were any solid arguments against a general scheme of education denominational in its character, and supported partly out of the rates and partly out of State-aid. Nevertheless, the decision of the Government had been that so far as the Bill which would be immediately brought in for dealing with Voluntary Schools was concerned, they did not propose to make any proposals with reference to rate-aid for the support of these schools. The public opinion of the Unionist party and of the managers of Voluntary Schools was not ripe for any change of the revolutionary character which rate-aid would necessarily involve.—We now know where the Government is on this question. But what will be the extent of the State-aid? Will it be 4s. again? If so, the so-called 'relief' will be a farce in some hundreds of schools, at least. Take the little school, with an average of about 60, where an additional adult teacher is sadly wanted. How far will this grant of £12 go towards providing the increased staff? And to what extent will the salary of the existing teacher be increased? Will the difficulties of the Managers of these schools be removed? The warning of the *Tablet* (Roman Catholic) is significant. 'If,' says that Journal, 'our people have been led to vote for the present Government under false pretences, then retribution, swift and sure, shall follow!'

The Y.P. Election, N.U.T. Several well-known men have been nominated for the office of Vice-President of the N.U.T., but Messrs. Blacker, Horobin, and John have retired, leaving the field to Mr. T. Clancy, Chairman of the Parliamentary Committee, and Mr. R. Waddington, Vice-Chairman of the Education Committee. Mr. Blacker was nominated by several Associations, and received most encouraging promises of support, but early in the present year he retired in order to strengthen Mr. Clancy's position. The contest, therefore, should be close and exciting.

Election of Executive. Turning to the list of candidates for the Executive of the N.U.T., I find that (taking the ladies first) Miss Cleghorn and Miss Selvage seek re-election. These ladies have done excellent work during the past year both in committee and at the Executive meetings. I hope it will not be considered presumption on my part if I ask my readers to give a vote to each when the time comes. Miss A. L. Broome, who was third on the list of unsuccessful candidates at the last election is again a candidate, and Miss Goodwin, well-known to members of the N.U.T. in connexion with the Southampton dismissal case, makes her 'first appearance.'

Among the men are three former members of the Executive, viz., Mr. J. Baldwin of Bedford, who rendered admirable service as Vice-Chairman of the Law Committee two or three years ago; Mr. F. B. Gill, B.A., recently dismissed by the Hanley School Board after an exceptionally brilliant career (I am not sure, however, that Mr. Gill will stand), and Mr. J. S. Jenkins. All the other candidates have taken an active part in Union work in their respective localities, and in all probability will do well at the poll. Mr. Cyrus H. Heller, B.A., Vice-Chairman of the Finance Committee, will not, I regret to say, seek re-election. His loss will be keenly felt, for he has laboured devotedly and unselfishly in the good cause, and among his colleagues he is, by common consent, admitted to be 'the best of good fellows!'

Rural Teachers' Conference. The recent Conference of Rural Teachers in Exeter Hall was undoubtedly a success, though many of the 'leading organs' have tried to prove that the indictment of the present system was carried too far. Those best qualified to judge must agree with the *Daily Mail* that 'Our rural education is a disgrace . . . . . starved teachers, useless plant, slack and incompetent management.' That is the position whatever *The Times*, *The Standard*, and others may say to the contrary. It would appear, from the comments in those papers, that any 'person' is good enough to teach rural children, no matter how unqualified such 'person' may be. And this, after more than a quarter of a century's experience of the Education Act! One can only express surprise and disappointment that such ignorance exists as to the real state of rural education. There can be only one conclusion, and that is, that the Union must use all the means at its disposal to bring home to the minds of the public the facts of the case. The *Eastern Daily Press* puts the matter clearly when it says: 'Village school teachers know what there is to see. They toil hard, they get poor pay, they are liable to arbitrary treatment, and some cynics put down all that is unsatisfactory to them. There could not be a more mischievous misunderstanding of the situation. They are competent persons, they do their duty, and more than their duty.'

A Strong Indictment. The Rurals came to town with the determination to state their case to the public, and they stated it. From my own personal knowledge I can vouch for it that many of the particulars given are absolutely true. Indeed, I believe an even darker picture could have been presented. Still, as it was, the details were too strong for *The Times* and *The Standard*, so, perhaps, it is just as well that the Rurals were so modest and so moderate in the charges they brought against the present 'system.' In the morning we had a private session, held, I believe, in order that the representatives might compare experiences, and in order, too, to educate those members of the Executive who might stand in need of such education! For which, of course, they ought to be—and, perhaps, are—grateful!

Mr. A. Winfield, Secretary, Rural Confederation, opened the ball with some strong remarks on school buildings and apparatus, want of drinking water and ventilation, etc. Other speakers, in interesting speeches, supplied details of the neglect of village education, one—our old friend, Mr. Clark, of Loughton—mentioning the case of a teacher who, in return for

an 'extra payment of 4d. a week' was expected to attend to the sanitary arrangements and cleaning of the school. Mr. Ratcliffe, a candidate for a seat on the Executive, made a couple of telling speeches during the day, speaking, as did all the others, from personal knowledge. On the question of attendance some startling facts were given by Mr. J. J. Davies, of Bourne, Mr. Holdaway, of Chichester, who declared, as many have declared before, that in many districts the magistrates connive at an evasion of the Act. Mr. Tegarty, of Glasinfryn, N.S. Bangor, supported in an able speech, which was well received. My old friend, Mr. J. Pierce, of North Tawton, introduced the subject of school staff, making an appeal to his fellow Rurals not to place their wives and children on the school staff *without any salary*, in order in some cases to avoid expense, and in others to get exceptional results. Mr. Tegarty is a young man, and therefore, with a by no means extensive experience, yet he has no difficulty in securing a second 'innings,' and he certainly 'scores'! One of our own 'Well-known Teachers at Work,' Mr. George West, of Beechwood School (Luton Association), had charge of 'Salaries,' and without inflicting a mass of figures on his hearers he made a capital little speech, quoting one case of a lady teacher who had been unable to go away for her Christmas holidays because her salary had not been paid. Some extraordinary particulars were given as to school houses, mere hovels, many of them, many others 'low, damp, and stuffy,' some with one living-room and one bedroom, and others with churchyard surroundings!

Mr. J. Kelly, of Fittleworth, Sussex, spoke from thirty years' experience of Extraneous Tasks, and once more begged us to start a Sustentation Fund, which should be large enough to support all who refused to perform extraneous tasks, and thereby suffered dismissal. Truly, a large order! Other weapons must, I fear, be employed for some years to come. Still, the sentiment of professional protection was, of course, a good one, and was well received accordingly.

The Exeter Hall Conference. In the afternoon we met in Exeter Hall, under the Chairmanship of the President of the Union, who made one of his characteristic speeches in opening the proceedings. It was a sweeping indictment of educational neglect in our villages, presented in Mr. Macnamara's best style. He concluded by asking for more generous financial assistance, more effective management. The General Secretary of the Union (Mr. J. H. Yoxall, M.P.) followed with an able speech on the condition of rural schools, referring to management, buildings, lighting, heating, water supply, furniture, apparatus, the attendance of scholars, and the supply of teachers (particularly in districts where the bilingual difficulty prevails), together with their payment and housing. In seconding, Miss Selvage (Member of the Executive) made one of the most effective and interesting speeches of the day. The applause which greeted her as she resumed her seat was thoroughly well deserved. Mr. G. Makin, of Aylesbury, followed, and then the resolution was carried with acclamation.

'The most effective protection England could establish is the education of the children in her villages,' was the conclusion of Mr. Ernest Gray's speech, but it was really the text from which he spoke, and spoke so well. Mr. Ratcliffe and Mr. J. J. Graves, of Lamport, the Union's first President, followed, after which the resolution, 'That in the forthcoming Education Bill provision should be made for special financial aid to be given to rural and other small schools in inverse ratio to the number of scholars,' was put and carried unanimously. I regret that I am unable, owing to considerations of space, to give details of the remainder of the Conference speeches, especially as they were so interesting and instructive. Mr. R. R. C. Gregory, for instance, followed up his Brighton success with another effort—clever, humorous, telling—which kept the audience in good temper and was received with loud cheers. The incident of the 'parish pump,' among other good things, was most enjoyable. I must not forget to give a word of praise to Mr. F. B. Gale (East Dereham) for his carefully-prepared address on the difficulties with which rural teachers are met on all hands.

No man is better qualified to deal with extraneous tasks and inadequate salaries than the Vice-President of the Union (Mr. C. J. Addiscott, Chairman of the Law Committee), and it is only necessary to say that he dealt with the subject in his usual masterly manner. After Mr. Muscott had seconded, Mrs. Burgwin, at the invitation of the President, added a few words and then the resolution, like all the others, was adopted unanimously. Mr. Wild (Past President) moved, and Mr. T. Butland, one of the veterans of the West, seconded a vote of thanks to the Chairman, this bringing the proceedings to a close. Mr. Butland's selection was a happy one, as, like the President, he is a Devonshire man. By the way, the President, Vice-President, and Ex-President are all Devonians. Is not this another Union (or County) 'record'?

The Grimsby Dismissal Case. We have had to fight many bad dismissal cases, but I think the Grimsby scandal is one of the worst. Miss Middleton, the mistress of St. Andrew's School, Grimsby, after a connexion of over twenty years with the school, received notice of dismissal in October last. Before accepting it she asked for the reason, but her application was met with silence. Her father then wrote on her behalf, but again silence! Miss Middleton placed herself in the hands of the Grimsby Association, with the result that the Law Committee soon had a representative on the spot inquiring into the facts. A little later more than two thousand people assembled in the Town Hall, under the Chairmanship of the member for the borough, to protest against the action of the managers. It appears that the mistress of the Infants' School and one of the curates of the church were engaged to be married. The two mistresses were intimate friends. The curate has felt it necessary to resign, the infants' mistress has been dismissed from her post, and now, as if to make a clean sweep, the managers have sent adrift the girls' mistress.

It may be, of course, that the action of the managers has been dictated by other considerations. If so, it would be well for those gentlemen to take the public into their confidence. In the meantime, Miss Middleton has the satisfaction of knowing she has the sympathy and good wishes of the Grimsby people and of every member of the Union to which she belongs.

Our Pupil Teachers. The Lord President has appointed a Committee to inquire into the working of the pupil-teacher system in England and Wales, and the supply of teachers as affected by that system, and to report whether any, and if so what, alteration is required in the existing Regulations of the Department as regards pupil teachers. The following are the members of such Committee:—The Rev. T. W. Sharpe, C.B., Her Majesty's Senior Chief Inspector of Schools; Mr. H. E. Oakeley and Mr. W. Scott Coward, Her Majesty's Chief Inspectors of Training Colleges; Mr. P. A. Barnett, Her Majesty's Assistant Inspector of Training Colleges (Secretary); Miss Hughes, of the Cambridge Training College; Mr. G. Noel Richardson, of the Oxford Day Training College; Miss Manley, of the Stockwell Training College; the Rev. G. W. Gent, of St. Mark's Training College, Chelsea; Mrs. Bannister, of the Pupil Teachers' Centre, Trafalgar Square, Stepney; and Mr. G. Collar, of the Pupil Teachers' Centre, Hackford Road, Stockwell.

Adding teachers to a Departmental Committee is a new departure, for which the profession may be grateful.

But having gone so far it is a pity 'My Lords' did not go a step further, and place upon that Committee someone who has had considerable experience in the training of pupil teachers, *apart from the centre system*. There is where the shoe pinches. Is it too late to suggest the addition now?

I observe with great pleasure that Mrs. Burgwin, a former member of the N.U.T. Executive, has been placed upon the Committee appointed to inquire into the education of children who are mentally afflicted. No better selection could have been made.

Should the Attendances be Cancelled? A correspondent informs me that the following is a common occurrence in his school:—'The registers are closed at 10.5, religious instruction being given from 9 to 9.45. When extra practices are required for the choir boys, the Vicar of the parish, who is the correspondent and the chairman of the managers, comes to the school and takes the lads away to the church, sometimes at 10.30, sometimes at 11, and so on. The teacher has pointed out to the Vicar that the attendances of

the boys should be cancelled, but he has been informed that they are to stand. What is he to do?

My answer is—cancel them. I do not believe a teacher is free in such a case to obey the manager, nor do I think it would be a sufficient defence to say, should the Education Department hear of the irregularity, 'I was acting under the direct orders of my managers.' A teacher has no choice in the matter. He, and he alone, is responsible for the registers, and his first care in connexion therewith should be to ensure their accuracy. If, after doing his duty, he is involved in any unpleasantness with the managers, well, there is the N.U.T. ready to fight the battle and protect him.

As a matter of fact, we have a case before us just now of a similar character. Our advice to the member, who has placed the particulars before us, is—*Do your duty.*

Recent Law Cases. The foregoing suggests to me some of our recent law cases. Many teachers, even now, are ignorant of the good work so quietly but so effectively performed by the Law Committee of the N.U.T., acting through the able official, Mr. T. A. Organ, B.A., Barrister-at-Law.

I could fill column after column of this journal with particulars of the various cases dealt with *at one meeting only.* Here is one from the Midlands. A boy was detained in school. The father came and demanded his release, but the teacher refused to allow the boy to go. Later in the day, after the other teachers had gone, the caretaker found the master in an insensible condition. It was proved that the father had visited the school again and committed a brutal assault upon him. A broken jawbone, eyes swollen and cut (preventing sight), and a frightful gash on the temples, were among the pleasantries indulged in by this ruffian, who was sentenced to two months' hard labour.

And here is another. An assistant teacher was much annoyed by the daily attentions of a number of lads who had adopted the practice of shouting outside his class-room window, and otherwise creating a disturbance. One day he ran out, caught one of the lads, and administered some little punishment. This was seen by a man who was passing, and this individual violently assaulted the teacher. The Law Committee at once instructed the local solicitor to take out a summons, and thus protect the master, who, fortunately for himself, is a member of the N.U.T. Tenure cases, assault cases, claims for salary, libels, slanders—these are dealt with at every meeting all the year round. Let me say, then, to every non-member of the N.U.T.: If you wish to insure yourself *against accident* enter the fold.

Other School Boards, please Copy. In my experience of N.U.T. legal cases, I have not often found many School Boards passing resolutions of sympathy with and confidence in the teachers employed when those teachers have been summoned for 'assaults' upon scholars! Generally speaking, if there is any action at all, it is a motion designed to give satisfaction to the parents. However, I have recently heard of a case of a small School Board passing a resolution supporting the teacher, and condemning the magistrates who convicted him, and I hasten to record the fact *pour encourager les autres!* The details of the case and of the conviction were reported to the members of the St. Albans Association at a recent meeting, and as I happened to be present, I felt it my duty to offer my sympathy to the teacher. The following week the School Board of the village in which the incident occurred, met and unanimously passed the resolution already referred to.

I congratulate the members of this School Board upon the possession of good sense and kind hearts. To the magistrates of the St. Albans Bench I commend the following lines by Kipling (they may be useful when similar school cases are being heard):—

'You may ride with an unused whip, ride with an idle heel,
But once in a way there will come a day when the colt must be taught to feel
The lash that falls, and the curb that galls, and the prick of the rowel steel.'

Inspection versus Examination. Serious complaints have been raised here and there as to the methods adopted by certain people in conducting the new system of inspection. Teachers may be quite sure of this—the genial Secretary to the Department, Sir George Kekewich, is determined that the system shall have a fair trial, and, that being so, teachers should insist upon the 'instructions' being carried out in an honourable and straightforward manner, for in that way only can justice be done.

Now and then one has heard of a combination of inspection and examination, which certainly was not intended by those responsible for the change. In one instance it appears that a most difficult 'story' was given to Standard V. for composition purposes—a story the 'point' of which could not possibly be seen by the average Standard V. boy or girl.

Well, this should be stopped. I have heard, too, of other difficult 'stories' being read to candidates for Labour Certificates, wholesale failures being the result. We shall find schools being judged by-and-by by the results obtained in these Labour Examinations. Indeed, I think I could give some interesting information even now! Here, again, there is work for 1897.

'COMPOSITION THEMES AND MORAL TRAINING.'

A SERIES OF LESSONS PREPARED ON A NEW PLAN FOR THE UPPER STANDARDS.

BY B. ELDERKIN,
Model School, Westminster College.

☞ THE LESSONS FULLY MEET THE LATEST INSTRUCTIONS IN THE NEW CODE, 1896.

SEE Introductory Notice in April number.

Hints for successful use of these lessons:—

a. The subject matter may be *read* over by the teacher or even by one of the scholars, or, better still, the teacher may previously read it and give the substance to the class in his own words. He may thus at discretion introduce other illustrations or omit some of those given.

b. The blackboard summary may be put before the class if the teacher is short of time, or, what is much better, a similar one may be made up while the class is being questioned on the matter of the lesson.

c. The whole of the essay should be put before the class at the first lesson, but it will often happen that there will be sufficient matter for two or more written exercises.

d. It is not intended that these lessons should be used exclusively, but that they should form a part of every month's Composition work.

e. Keep the best exercises, so that the Inspector may see the plan upon which they have been worked, as well as the topics written upon, or have a separate exercise book for Composition.

LESSON VII.—THE VICTORIA CROSS.

1. The Order of the Victoria Cross was instituted in February 1856, as a means of rewarding distinguished courage in the rank and file of both the naval and military branches of Her Majesty's forces. It consists of a bronze Maltese Cross, which is pinned to the left breast and suspended by a blue riband for seamen, and by a red one for soldiers, and which bears on a scroll the words '*for valour.*'

2. A second act of heroism by a wearer of the Victoria Cross is rewarded by a bar across the riband, and each subsequent recognition by an additional bar. It carries with it also a pension of £10 a year, which is increased by £5 for each bar.

3. Where all are brave it is not easy to single out individual acts which merit the coveted honour; but such is the care taken in the selection of persons to receive it, that no single breath of suspicion of favouritism has at any time been raised by its bestowal. To show how jealously the order is guarded, it may be mentioned that only about 365 awards have been made since its institution—a period of over 40 years.

4. The first crop of winners of the coveted honour was produced by the Crimean War. Then followed the Indian Mutiny, which afforded a fine field for the display of heroic deeds. Other crosses were won by pioneers in Australia and New Zealand.

5. It is unnecessary to enumerate the heroic deeds of the 365 honoured winners of the Victoria Cross; but they represent a tale of devotion to duty, love of comrade and country, and such utter disregard of personal injury as may well make us proud to think of them as our fellow countrymen. A few examples of the kind of service rewarded by the Victoria Cross must suffice.

6. In the Crimean War a shell from the Russian forts fell among our powder casks. As the fuse of the shell was burning a terrible explosion must have occurred in a second or two unless something were instantly done. Captain Peel seized the shell and hurled it over the parapet into the water, regardless of the terrible danger of himself being blown to pieces. A seaman performed a similar act of daring with a shell which fell upon his ship without immediately bursting.

7. After an assault on the fortress of Sebastopol, a soldier, who had been shot through both legs, was observed pitifully calling for help. Commander Raby and two volunteers went forth in the teeth of a murderous fire, with shells flying all about them, they carried their wounded comrade to a place of safety.

8. During the charge of the Light Brigade an officer's horse stumbled and threw his rider, who at the same moment lost his sword. He was furiously attacked by two Cossacks; but they had to reckon with Samuel Parkes, who saw the peril of his officer and came to his help. Parkes had no sooner driven off the Cossacks than he was set upon by six Russian soldiers; but so fiercely and powerfully did Parkes lay about him, that he kept the six soldiers at bay until his sword was struck from his hand. Then he yielded, was afterwards released, and received his Victoria Cross.

9. One other instance may be given from the Crimean War. On the 9th August special despatches were sent by the Emperor of Russia to his General who was in charge of the Island of Wardo. It was of the utmost consequence to the British that those despatches should be stopped, and if possible captured.

Commander Bythesed begged that he and a stoker named William Johnson, in whom he had the utmost confidence, might be allowed to land on the island and capture the despatches before they reached the Governor.

Disguised, and fully armed, they were rowed to the shore, where they concealed themselves in some bushes. There they had to wait for several days in the greatest suspense, for, beside the hunger, exposure, and want of rest, from which they suffered, there was ever present to their mind the haunting dread of discovery, which would have been followed by instant death.

At length the messengers were seen to approach, escorted by five soldiers fully armed. Waiting for the most favourable moment, the two British soldiers fell upon the party. Three were rendered helpless, and after a desperate encounter the rest were overcome, hustled into the boat and rowed across to the *Arrogant*, amid the ringing cheers of the crew, who were anxiously watching for their return. The despatches proved to be of the utmost value, and the two gallant men had well earned their Victoria Crosses.

10. The first distribution of the Victoria Cross took place after the close of the Crimean War, and was a brilliant and memorable scene. The Queen made the awards with her own hands. She was accompanied by the lamented Prince Consort, and attended by a brilliant array of officers and notables. Detachments of the various regiments which had furnished the heroes were drawn up, and there was a tremendous crowd of spectators who had come to see their Sovereign and help to do honour to their brave fellow countrymen.

One by one the 62 officers and men filed before Her Majesty, who stooped in her saddle and pinned the coveted cross upon the left breast of the tunic. Thus the method of bestowment became as great an honour as the decoration itself.

Blackboard Summary.

THE VICTORIA CROSS.

1. When and why it was instituted.
2. What the honour is and the pensions attached to it.
3. The care in its bestowal: number of wearers.
4. Examples from the Crimean War.
   - (*a*) Captain Peel and the burning shell.
   - (*b*) Commander Raby and the rescue of a wounded comrade.
   - (*c*) Samuel Parkes: defence of officer against two Cossacks: encounter with five soldiers.
   - (*d*) How Commander Bythesed and the stoker Johnson captured the Russian despatches.
5. Distribution of the first crosses by the Queen in Hyde Park.

OUR 1897 CERTIFICATE CLASS.

BY J. C. HOROBIN, M.A.,

Principal, Cavendish College, Cambridge.

The Examination for Certificates will commence on Monday, 12th July 1897, at 2 p.m.

The general conditions for candidates are to be found in Articles 55–64 and 116–121 of the current Code.

QUESTIONS FOR TESTS.

FIRST YEAR.

1. Write in large, text, and small hand:—
   'Newness is the one important factor of attraction.'
2. Dictation:—
   It would be amusing | to take a digest | of the irrational laws | which bad critics | have framed | for the government of poets. | First in celebrity | and in absurdity | stand the dramatic unities | of place and time. | No human being | has ever been able | to find anything | that could, | even by courtesy, | be called an argument | for these unities, | except that they have been deduced | from the general practice | of the Greeks. | It requires | no very profound examination | to discover | that the Greek dramas, | often admirable as compositions, | are, as exhibitions of human character | and human life, | far inferior to the English plays | of the age of Elizabeth. | All the greatest masterpieces | of the dramatic art | have been composed | in direct violation of the unities, | and could never have been composed, | if the unities | had not been violated.

School Management.

1. What is the difference between voluntary and involuntary attention? Show how the latter may be strengthened by suitable exercises.
2. Write notes of a lesson on the eye.
3. What do you think is the end to be gained by 'tots,' and how are the exercises most easily given and examined?

Composition.

1. Responsibility of wealth.
2. He who needs excuse must needs excuse.
3. Games.

Arithmetic.

1. Prove that $\frac{3}{4}$ of $\frac{8}{9}$ of a unit is equal to $\frac{2}{3}$ of the same unit.
2. Define prime, complex fraction, average, present worth, stocks.

Multiply 3·14159 by ·69897 correctly to seven places.

3. Simplify $\frac{61^2 - 60^2}{105^2 - 104^2} \times \frac{62^2 - 61^2}{116^2 - 112^2}$

Music.

1. Write the time names (as *taa* or *taa-tai*, etc.) of the following pulses:—

Time Names.

(1) | 1,1 .1,1 :1 ‖ (2) | 1 :1 .1 ‖ (3) | .1 :1 ‖

(4) | 1 :- .1 ‖ (5) | 1 .1,1 :1 ‖ (6) | 1 .,1 :1 .1 ‖

2. Re-write the following in two-pulse measure, halving the value of each note and rest :—

(1) | m :— | r :d ‖ (2) | s :s .l | s : ‖

(3) | m :- .f | s :d .d ‖ (4) | m :— | — :— ‖

(5) | r :— | —: ‖ (6) | :r .m | f :m ‖

3. Note tests for Division II. in schools include :—

A passage introducing the tones of the Doh chord IN ANY ORDER, *and the other tones of the scale in* STEPWISE *succession.*

Write a passage of about twenty notes (without time) in accordance with these requirements.

4. State the meanings of the following terms :—(1) Molto ; (2) Sempre ; (3) Sostenuto ; (4) Tempo primo ; (5) Con Moto ; (6) Con Brio.

English.

1. Give instances from the poems of Tennyson's knowledge of the Greek and Latin Classics, and explain the meaning of such allusions as you quote.

2. Give examples of the different uses of the infinitive mood.

3. Write down any passage (not less than ten lines) you can remember from 'Sir Roger,' and parse all the verbs.

Geography.

1. What parts of Africa are connected with the British Empire? Explain exactly the nature of the connection.

2. Draw a map of the west coast of Africa, showing the principal states and coast towns.

History.

1. What do you understand, ecclesiastically and politically, by Episcopalian, Presbyterian, Independent, at the time of Charles I.?

2. Compare the settlement of religious toleration under Charles I., Cromwell, and Charles II.

MEN ONLY.

Algebra.

1. Prove $(a^m)^n = a^{mn}$ when m and n are positive integers.
Find the square root of $1 - 4x$ to four terms.

2. If A varies as B when C is constant, and A varies as C when B is constant, then will A vary as BC when both B and C vary.
If $a : b :: b : c :: c : d$
then $(a + d)(b + c) - (a + c)(b + d) = (b - c)^2$.

Geometry.

1. Prove III., 31.
If two circles touch, any line drawn through the point of contact will cut off similar segments.

2. Prove II., 14.
If the medians of a triangle intersect on O, prove
$AB^2 + BC^2 + CA^2 = 3(OA^2 + OB^2 + OC^2)$.

WOMEN ONLY.

Needlework.

1. Cut out one leg of a pair of drawers for a child of six (left side), and make up by tacking.

Domestic Economy.

1. Explain fully what is meant by 'nutritive food,' and name six such foods in order of value.

2. Name the staple materials of clothing in use among the labouring class. Give some account of each and its special value.

OR,

1. Prove I., 16.
In any triangle the perpendicular from the vertex opposite the side which is not less than either of the remaining sides falls within the triangle.

SECOND YEAR.

Penmanship.
Dictation.
Composition.
Geography.
History.
Arithmetic.
Music.
} As First Year.

School Management.

1. Give a description of the best and most completely furnished school-room you have ever seen ; specify in detail its dimensions, its furniture and apparatus, and its decoration. Describe particularly the form of seat and desk best calculated to secure the comfort and the healthy attitude of the scholars.

2. What are the requirements of the Code in Arithmetic, English, and Geography in the fifth standard, and what books should be in use in it?

3. Give the substance of Fitch's lecture on learning and remembering.

English.

1. Compare the two plays you are studying with special reference to the dramatic unities.

2. 'The Idylls illustrate the seasons, physical and spiritual.' Comment on and illustrate this statement.

MEN ONLY.

Algebra.

1. All of First Year.

2. Solve—
(*a*) $x^4 + 5 - 2\sqrt{x^2 - 2} = 5x^2$.
(*b*) $2x^2 + 3y^2 - xy = 31$.
$x - y = 3$.

Geometry.

1. All of First Year.

2. Prove Prop. 10, Book IV.
PQR is such a triangle, the base angles are bisected by QST, RSV, which meet the circle described about the triangle at T, V respectively. Show that PTSV is a rhombus.

WOMEN ONLY.

Needlework.

1. Cut out and tack together the left-hand side of the upper part of a boy's shirt, setting in one sleeve.

Domestic Economy.

1. All of First Year.

2. Give a summary of what you know about methods of saving and investment.
What are the special weaknesses of Building Societies and Friendly Societies?

OR,

1. Euclid, as First Year.

2. Prove I. 35.
Every median of a triangle bisects the triangle.

TWO ALGEBRA PAPERS AND THE SOLUTIONS TO THEM.

Students should study them carefully.

FIRST YEAR.

1. If $\frac{a_1}{b_1} = \frac{a_2}{b_2} = \frac{a_3}{b_3}$, etc., then any of the fractions is equal to
$$\frac{pa_1 + qa_2 + ra_3 + \dots}{pb_1 + qb_2 + rb_3 + \dots}.$$
If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ prove
$$\frac{a^2 + c^2 + e^2}{b^2 + d^2 + f^2} = \frac{(a + c + e)^2}{(b + d + f)}$$

2. Find the condition that $ax + by = c$, and $a^1x + b^1y = c^1$, may be (1) inconsistent, (2) not independent.

3. Of what values is the expression $\frac{7x^2 + x + 3}{x + 1}$ capable?

4. Show that any number is divisible by $r + 1$ if the difference between the sum of the odd and the sum of the even digits is divisible by $r + 1$.
If S be the sum of the digits of a number N, and $2Q$ be the sum of the digits of $2N$, the number being expressed in the ordinary scale, show that $S \sim Q$ is a multiple of 9.

SECOND YEAR.

1. If $(1 + x)^n = a_0 + a_1x + a_2x^2 + \dots$, find the value of—
(*a*) $a_0a_r + a_1a_{r-1} + a_2a_{r-2} + \dots$
(*b*) $a_0^2 + a_1^2 + a_2^2 + \dots$.

2. If any algebraic expression in x becomes zero when a is substituted for x, then the expression is divisible by $x - a$.
Prove $x^n - nx^{n-1}x + (n - 1)a^n$ is divisible by $(x - a)^2$.

3. Find the number of ways in which n things can be given to two persons.
Prove that $1 + {}_nC_2 + {}_nC_4 + \dots = {}_nC_1 + {}_nC_3 + \dots = 2^{n-1}$.

4. If m shillings in a row reach as far as n sovereigns, and a pile of p shillings be as high as a pile of q sovereigns, compare the values of equal bulks of gold and silver.

SOLUTIONS.—FIRST YEAR.

1. *Bookwork.*—C. Smith's 'Smaller Algebra,' par. 137, page 140.

$$\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=k, \text{ then } \frac{a^2}{b^2}=\frac{c^2}{d^2}=\frac{e^2}{f^2}=k^2,$$

$$\text{or } \frac{a^2+c^2+e^2}{b^2+d^2+f^2}=k^2=\left(\frac{a+c+e}{b+d+f}\right)^2.$$

2. See C. Smith's 'Larger Algebra,' par. 144.

3. Let $$y=\frac{7x^2+x+3}{x+1},$$

then $$x=\frac{-(1-y)\pm\sqrt{(1-y)^2-28(3-y)}}{14}.$$

If x is real, $y^2-26y-83$ is positive.

If $$y^2-26y-83=0,$$

$$y=-13\pm\sqrt{252},$$

the roots are real and unequal.

∴ the expression has the same sign as the coefficient of y^2 (*i.e.* +) unless y lies between these roots.

∴ if x is real y cannot lie between

$$-13+\sqrt{252} \text{ and } -13-\sqrt{252}.$$

4. See C. Smith's 'Smaller Algebra,' par. 290.

$N-S$ is a multiple of 9;
∴ $2N-2S$,, ,, ,, 9.
Also $2N-2Q$,, ,, ,, 9;
∴ $2Q-2S$,, ,, ,, 9;
∴ $Q-S$,, ,, ,, 9.

SOLUTIONS.—SECOND YEAR.

1. (*a*) $(1+x)^n=a_0+a_1x+\qquad\qquad+a_{n-r}x^{n-r}+$

also $(1+x)^n=a_n+a_{n-1}x+\qquad\qquad+a_rx^{n-r}+$,

writing in reverse order.

∴ $a_0a_r+a_1a_{r-1}+$ is the coefficient of x^{n-r} in the product of the two expansions, viz., of x^{n-r} in $(1+x)^{2n}$, or

$$\frac{\lfloor 2n}{\lfloor n-r \;\lfloor n+r}.$$

(*b*) $(1+x)^n=a_0+a_1x+$

$(1+x)^n=a_n+a_{n-1}x+$

∴ $a_0^2+a_1^2+$ is the coefficient of x^n in the product of the two series, viz., the coefficient of x^n in $(1+x)^{2n}$,

$$\text{viz., } \frac{\lfloor 2n}{\lfloor n \;\lfloor n}.$$

2. For first part see par. 267 (Smith).

$$x^n-na^{n-1}+(n-1)a^n\equiv(x^n-a^n)-na^{n-1}(x-a),$$

which is clearly divisible by $x-a$, giving

$$x^{n-1}+x^{n-2}a+\ldots.+a^{n-1}-na^{n-1}$$

as quotient.

But this is divisible by $x-a$, for on substituting a for x the expression vanishes.

∴ Original expression is divisible by $x-a$.

3. Bookwork. See par. 237, where r is made 2, and pars. 249 (1) r (2), noting that in (2) the sum of either of the series is equal to half the result in (1).

4. Take 1*s.* as the unit of value and bulk.

Then area of 1*s.* : area of £1 $=1^2:\left(\frac{m}{n}\right)^2$;

height of 1*s.* : height of £1 $=1:\left(\frac{p}{q}\right)$;

$$\therefore 1^2\times 1:\frac{m^2p}{n^2q}=\text{bulk of 1s. : bulk of £1},$$

or when bulk of 1*s.* is unity, the bulk of £$\frac{1}{20}$ is $\frac{m^2p}{20n^2q}$;

$$\therefore \text{value is } 1:\frac{m^2p}{20n^2q}.$$

SYLLABUS OF WORK FOR THE MONTH.

Students are advised not only to get up the work indicated, but also to use the test questions as indications of work to be got up and afterwards written out.

FIRST YEAR.

School Management.

1. Notes of Lessons, skeleton and full, criticism, use of B.B. in teaching.
2. Writing, stages of instruction, slope, use and abuse of copy-books, size, schemes for infant schools, classification of errors.
3. Spelling, methods of instruction and practice.

Composition.

1. Winds and clouds.
2. Arbitration.
3. War.
4. Peace, and the effect of commerce in maintaining it, or the reverse.

Arithmetic.

Not less than six examples from miscellaneous sets ought to be worked per week, as well as those on the particular work set and the examination questions given.

1. Pars. 221, 222, 225, P.
   Par. 376 and examples on it.
2. Pars. 227–235 inclusive, P.
   Par. 377 and examples on it.
3. Pars. 236–241 inclusive, P.
   Par. 379 and examples on it.
4. Pars. 243, 244, 248, 249, 250, P.
   Par. 381 and examples on it.

Music.

1. Measures and their pulse signs.
   Minor thirds of the scale.
2. Characteristics of tones.
   Keys, signatures and their signification.
3. Intervals and their inversions.
   Major thirds of the scale.
4. Strong, weak, and medium pulses.
   Minor seconds of the scale.

English.

1. Verbs—strong and weak and their points of distinction.
2. English—origin and relationships.
3. Verbs—auxiliary, uses and history.
4. Rules of punctuation—types of metre.

Literature.

1. Dream of Fair Women.
   Comparison of Addison and Steele.
2. The Coverley Hunt.
   Deighton's General Introduction.
3. Dream of Fair Women.
   The 'Whig Examiner' and 'Guardian.'
4. The Coverley Witch.
   Notes already given on Tennyson.

Geography.

1. States of Western Africa and their productions.
2. Rivers and Lakes of Africa.
3. Egypt, Nubia, and Soudan.
4. Races of Africa.

History.

1. Richard II.
   Norman Conquest.
2. England after Peninsular and Waterloo Campaigns.
   Langton, Burke.
3. Henry IV.
   Reformation.
4. Canning Administration.
   Beckett, Walpole.

1. New England—Hyde.
2. Short Parliament—Laud.
3. The Tyranny—Hampden.
4. Long Parliament—Strafford.

MEN ONLY.

Algebra.

1. Par. 137, Smith or the same elsewhere.
   Geometrical Progression.
2. Quadratic equations, definition, methods of solution.
   Harmonic Progression.
3. Irrational equations.
   Geometrical Progression (proof of rules).
4. Relation of roots and coefficients in Q.E.

Geometry.

1. Book I. 16–24.
   ,, II. 1 and 7.
   ,, III. 9–12.
2. Book I. Axioms 25–35.
   ,, II. 2 and 9.
   ,, III. Definitions 13–16.
3. Book I. Definitions 36–39.
   ,, II. 3 and 10.
   ,, III. 17–20.
4. Book I. Postulates 40–45.
   ,, II. 4 and 11.
   ,, III. 21–26.

WOMEN ONLY.

Needlework.

Back and front, upper half, right-hand side of woman's chemise—all stitches used therein.

Domestic Economy.

1. Recipes for cookery for sick.
2. Investments and savings.
3. As 1.
4. As 2.

OR,

Euclid Book I. 25–30.
Revise Axioms.

SECOND YEAR.

Composition.
Music.
Arithmetic.
Geography.
History.
} As First Year.

School Management.

1. First two weeks of First Year.
   Analogies of Logic and Grammar.
2. Fitch VII.
   Sensation, perception, observation.
3. Second two weeks of First Year.
   Terms.
4. Fitch III.
   Memory, and exercises to strengthen.

English.

1. First two weeks of First Year.
   'Merchant of Venice,' Act IV., Scene 2.
2. 'Passing of Arthur.' First half.
   'Macbeth,' Act II., Scene 3.
3. Second two weeks of First Year.
   'Merchant of Venice,' Act V., Scene 1, to line 126.
4. 'Passing of Arthur.' Second half.
   'Macbeth,' Act II., Scene 4.

MEN ONLY.

Algebra.

As First Year.
1. Permutations.
2. Binomial Theorem.
3. Permutations.
4. Binomial Theorem.

Geometry.

As First Year.
1. Book IV., Definitions and I.
   ,, VI. Prop. 11.
2. ,, IV. Props. II.–III.
   ,, VI. Prop. 12.
3. ,, IV. Prop. IV.
   ,, VI. Prop. 13.
4. ,, IV. Prop. V.
   ,, VI. Prop. 14.

WOMEN ONLY.

Needlework.

As First Year.
Also stroking and setting in with sewing on of different kinds of buttons.

Domestic Economy.

1. Savings and Investments.
2. Common Accidents and First Aid therein.
3. Housewifery.
4. Savings and Investments.

OR,

Euclid as First Year.
Also Propositions 38–39, and revise 26 and 35.

SCIENCE NOTES.

SEEDS AND THEIR ABSORPTION AND EMISSION OF WATER.—M. H. Coupin has recently made some interesting experiments with regard to the absorption and emission of water by seeds. He finds that the absorbing power of water in the same kind of seed varies greatly. Dormant seeds, speaking generally, absorb as much water as living seeds, but temperature seems only slightly to affect the absorbent power of seeds. Seeds are capable of absorbing aqueous vapour directly, especially by the embryo. The bursting of the integument of the seeds when they germinate, Coupin says, is not due altogether either to the increase in size of the embryo or to the direct force of the germinating radicle; it is probably brought about by a diastase which has the property of disorganising the integument and decreasing its resisting power. When seeds are plunged in water, dilatation takes place, followed by contraction if the seed has a thin folded integument. The contraction is due to a chemical combination of the reserve materials with water, the dilatation to a rapid imbibition by the integument. When they are ripening, seeds become desiccated by transpiration, not by simple evaporation.

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KITE PHOTOGRAPHY.—Kite photography will probably soon receive a further development. At Rotch's observatory near Boston, U.S.A., some interesting experiments in kite flying have lately been carried out. The kites used were of the tailless Eddy or Hargrave box type, the ordinary string being replaced by piano wire. A height of 8,750 feet was attained with a pull of ninety-five pounds. Several meteorological instruments were sent up attached to the kites, and it is now proposed to send up cameras.

***

JUMPING BEANS AND COCOONS.—The so-called jumping beans have been further investigated by M. Yeatman Woolf. He declares that the apparent leaps are due to the eccentric shape of the beans. He carefully removed the woody fibre of some beans so as to leave intact the silken bags containing the live maggots. Then the beans, in spite of the decrease in weight, although they still continued to move, did not appear to lift themselves at all from the sheet of blackened glass upon which they lay. He kept several of the maggots in artificial wax houses, in which were inserted windows. He says that when the grub has covered up an aperture with its silk, it afterwards darkens the same with juices formed out of the excreta until it assumes a brownish colour. In one case a bean was found to contain an ichneumon tucked up alongside the cocoon, but dead. From this fact of the interior of the bean having a silk lining similar to all those that contain maggots, and from the excreta, it is supposed that the ichneumon parasite had eaten the caterpillar. The jumping cocoons described by Dr. Sharp in the *Entomologist* are far more active. They were sent to him from South Africa. They sprang out of tumblers in which they were placed. Apparently their motive power is due to the enclosed pupa. The cocoon is hard, as if formed of pottery, but on the front of the head of the pupa is a sharp chisel-edge, enabling it to cut its way out. The pupa contracts itself to the utmost in the hinder part of the cocoon, and retains itself in that position by hooks on the mobile parts of its body. It is thus in a condition of elastic tension, and on releasing the hold of the hooks is discharged forwards, so that the chisel-edge strikes the front part of the cocoon. After this operation has been repeated a number of times, the end of the cocoon becomes weakened and the insect is liberated. The jumping of the cocoon is thus caused by the shocks communicated by the pupa.

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NIAGARA AND ELECTRICITY.—The city of Buffalo, twenty-six miles from Niagara, is now beginning to reap the advantage of the machinery erected at Niagara Falls for the production and distribution of electric power last November. The city has contracted for ten thousand horse-power from Niagara, the street carsare being worked by electricity thus supplied, and it is anticipated that the whole neighbourhood will in time be covered with smokeless factories.

Our Science Section.

Subscribers requiring Explanations of Difficulties in any Branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this No.

NOTES ON PHYSIOLOGY:

EMBRACING THE SUBJECTS OF THE ADVANCED AND HONOURS STAGES, SCIENCE AND ART DEPARTMENT.

BY WALKER OVEREND, M.A., M.D. (OXON), B.SC. (LONDON),

Physician to the Tottenham Hospital;
Late Radcliffe Fellow, Scholar of Balliol College, and Exhibitioner in Comparative Anatomy of the London University.

1. Give an account of the position, attachments, and structure of the diaphragm. State the origin, course, manner of ending, and function of the nerves distributed to it. Describe the movements, and explain how these movements lead to the entrance of air into, and exit from, the chest. (26.)

2. Describe the muscular movements which take place in ordinary quiet respiration. Explain how these movements lead to the entrance of air into, and exit of air from, the lungs. How are the movements changed when, by obstruction in the trachea or otherwise, the air is prevented from passing in or out of the lungs? How is the change brought about? (26.)

The subject of respiration—the muscular movements, the nerves concerned, and the composition of arterial and venous blood—is most essential, and the student should know and understand it thoroughly.

A constant renewal of the air within the lungs is necessary, in order that a fresh supply of oxygen should be supplied to the body; and this is secured by the movements of the thorax. The thorax is an air-tight chamber, and air can enter and leave it only by the trachea. Naturally it has three dimensions, longitudinal, transverse, and an anteroposterior—the last running from the sternum in front horizontally to the backbone. One layer of the pleura lines the walls of the thorax, and the other or visceral layer, which covers the lungs, glides smoothly over the outside layer, just as a glass-plate when moistened can be moved over another one, that is by virtue of adhesion. When the cavity of the thorax is increased by muscular action, the layer of pleura gliding over the outside layer must move and stretch, and in this way the lungs, that is the air vesicles, expand. Becoming larger, air must enter from the outside in order to fill the increased space. This is *inspiration*. When the capacity of the chest is diminished, an event which takes place when the muscles cease to contract, air is expelled. As a matter of fact, air is introduced into the lungs during inspiration in a manner very similar to that by which air is drawn into a concertina when it is drawn out.

The most important muscle is the diaphragm. It consists of muscular fibres, which are attached on one side to the circumference of the chest, and on the other pass to a central tendinous portion. The muscular fibres are attached at the circumference to the cartilages of the six lower ribs, to the lowest part of the sternum, and behind to the upper three lumbar vertebræ. There are two openings in the diaphragm behind, one called the *aortic* opening, through which the aorta and thoracic duct pass, a second, called the *œsophageal*, through which pass the œsophagus and the two vagus nerves. There is also an opening in the central tendon, through which the Inferior Vena Cava passes to the right auricle. The diaphragm is supplied by the two *phrenic* nerves, which arise from the fourth and fifth cervical spinal nerves, and run down between the heart and lungs. These nerves on reaching the diaphragm divide into branches, and the fibres are distributed to the muscular fibres in the same way as in striped muscle.

The central tendon is convex, the dome of the arch looking upwards to the chest. When the diaphragm contracts, the central tendon is drawn down a little only, but the muscular fibres all around the sides become straighter, and hence the longitudinal diameter is increased. (*Vide* Diagram 65, Author's 'Elements of Physiology.') When one of the phrenic nerves is divided, its side of the diaphragm remains motionless; if both phrenics are divided, the diaphragm is completely paralysed.

During ordinary quiet respiration the ribs are also elevated by certain muscles, and this raising of the ribs increases the transverse diameter, and, at the same time, by pushing out the sternum increases the anteroposterior diameter. These muscles are:—

1. The levatores costarum.
2. The scaleni.

Practically these, with the diaphragm, are the only three muscles coming into play during ordinary quiet breathing.

If the entrance of air become interfered with, that is, if respiration becomes embarrassed, many other muscles come into action, and the respiration is now termed extraordinary or laboured. During inspiration such muscles as the *sternomastoid* (which runs from the temporal bone behind the ear to the clavicle and sternum), the large pectoral muscles (passing from the chest to the humerus), the trapezius muscles, etc., come into play. The external intercostals also now become useful.

Normal expiration is quite a passive movement. The diaphragm, scaleni, and levatores costarum cease to contract, and the lungs contract by virtue of the elastic tissue they contain, which has been, during inspiration, put slightly on stretch. Also the ribs, especially the cartilages, are elastic, and they react in the same manner. But during embarrassed expiration, a large number of muscles take part; for instance, the muscles of the abdominal wall now contract, in order to push the diaphragm back into its former situation; also the internal intercostal muscles become active.

Even during the pause between one expiration and the next inspiration the lungs are slightly stretched, so that if an opening be made in the side, as by the stab of a knife, the lung of that side collapses, and the movements of respiration then only produce on that side a rushing of air in and out of the pleural cavity; with each inspiration air rushes in, through the wound, and with expiration it bubbles out again. (This question was set in May 1886.)

When, however, the obstruction in the trachea becomes more severe, or if it should become entirely closed, the person suffers from asphyxia. At first the respirations become quicker and deeper (*dyspnœa*), and very soon the expiratory movements become very marked. Every muscle that can assist is pressed into action, until nearly all become involved in the expiratory struggle. At the end of about a minute convulsions occur, and these are due to the influence of the venous blood on the medulla oblongata.

During the second minute the convulsions cease. When the cornea is touched, the eyelid is no longer closed, showing that reflex action is abolished, and the pupils are widely dilated. With the exception of an *inspiration* at intervals, there is perfect quietness of the muscles. Before death, which usually occurs after three or four minutes, there are a few gasps, the

head is thrown back, the limbs stretched out, and the mouth opened widely. There are, therefore, three stages: (1) that of dyspnœa; (2) that of convulsions; (3) that of exhaustion.

The opposite condition to asphyxia is termed *apnœa*—when the respiratory centre is so saturated with oxygen that no respiratory movements take place at all. We shall speak of this in connection with the nervous mechanism of respiration.

Describe the structure of an artery as made out (*a*) without the help of, (*b*) with the help of, a microscope. What are the two chief properties of an artery in the living body? How do large and small arteries differ in regard to these properties? What part do these properties respectively play in carrying on the circulation of the blood? (26.)

What differences exist in the rate of blood-flow and in the pressure at which blood flows in the arteries, veins, and capillaries? What is the precise cause of these differences? By what means may the amount of blood sent through any given part of the body be made to vary in accordance with the varying needs of that part? (26.)

A large artery, as the aorta, is a tube with strong walls. When examined with the naked eye, we first make out: (1) a loose tissue covering it—connective tissue, and (2), the main substance, which may be stripped up in layers, by means of forceps, and these pieces are elastic. In fact, it is mainly made up of elastic tissue. Under the microscope, however, three layers are distinguishable: (*a*) an *inner* coat lined by endothelial cells, and consisting of elastic tissue entirely; (*b*) a *middle* coat, which contains elastic tissue, with layers of unstriped muscle arranged concentrically; and (*c*) an *external* coat of connective tissue.

In the larger arteries the muscular tissue is very small in amount—in the smaller arteries the muscular tissue is of greater importance, and exceeds the elastic in amount. The two properties which an artery possesses are (*a*) elasticity, (*b*) contractility.

Elasticity is one of the factors of use in propelling the blood. For instance, when the left ventricle contracts and sends blood into the aorta, the latter dilates in order to receive it; in other words, its elastic tissue is stretched. When the diastole takes place, the wall of the artery tends to recover its shape, it therefore contracts, and in so doing must aid in forcing the blood onwards, since the semilunar valves are now closed. This property of elasticity is purely *physical*, and is therefore possessed by arteries after death. On the other hand, contractility is a *vital* property, and depends on the muscular tissue in the middle coat. It is, therefore, exhibited better by the smaller arteries. This contractility is naturally dependent on the nerves which supply the unstriped muscle, and the nerves spring from the vasomotor centre in the medulla oblongata, hence they are termed vasomotor nerves.

If an artery be cut across in a living animal, blood spurts from it to a considerable height, escaping in jets, each jet corresponding to the beat of the heart. In other words, the blood runs through the arteries at considerable pressure. This so-called blood pressure or arterial pressure is naturally highest in the left ventricle of the heart, when it contracts, and after that in the aorta. As the arteries divide and subdivide, the pressure will get less and less. Now if a vein be cut across, the hæmorrhage is of quite a different character. It oozes out gradually and regularly, and is not affected by the beat of the heart; moreover, the pressure under which it flows, is very small. Thus the blood flow in the arteries is intermittent and at high pressure; in the veins it is uniform and at a low pressure.

The cause of the change lies in the capillaries. The area of the capillaries exceeds by several hundred times that of the aorta itself.

Moreover, there is considerable resistance in the capillaries, because of the friction against the walls. Owing to the increased resistance the blood cannot therefore escape in jets; some must remain behind. Also the elastic reaction of the arteries tends to make the flow more uniform, since each artery, which is distended at the beat of the heart, tends to return to the original size before the next beat, and hence to drive the blood onward between the beats.

The rate of blood-flow must also diminish the further from the heart; in the aorta the blood travels at the rate of, perhaps, one foot per second, in the capillaries, not more than one *inch* per minute.

Through the capillaries, therefore, the blood flows in a uniform stream. The red corpuscles lie in the centre, where the stream is quicker, and form a red line, in which the individual corpuscles may not be distinguishable. Outside this line there is a clear space, where, owing to friction against the wall, the speed is much reduced, and in this layer white corpuscles may be seen. In very small capillaries, however, there is no outer clear layer, since the red corpuscles themselves fill up the space.

With regard to the latter part of the second question let us take as an instance the stomach. It is chiefly after food is eaten that the gastric glands require more blood, as then they begin to secrete actively. The increased amount of blood is obtained through the vaso-motor nerves. The presence of food in the stomach stimulates its sensory nerves, and as a result impressions are carried up to the vaso-motor centre, which inhibit the nerves of the blood vessels of the stomach. These small arteries dilate, and as a result more blood passes through them, to supply the mucous membrane of the stomach. As a matter of fact, the quantity of blood passing through an organ depends upon its activity, and this dependence is secured by means of the vaso-motor system.

MAGNETISM AND ELECTRICITY.

BY EDWIN EDSER, A.R.C.S.,

Mathematical Lecturer and Physical Demonstrator, South Western Polytechnic, late Assistant in the Physical Laboratory, Royal College of Science.

THE mechanical action along lines of force has been compared to the tension in a stretched elastic filament; but a very important difference in the two cases must be carefully noted. The force of restitution called into play by stretching an elastic filament is proportional to its extension; whilst the force along a line of force is constant. The reason that a greater force is exerted between two charged spheres when placed close to each other than when more widely separated, lies in the fact that the lines of force between the two approximate more closely to straight lines as the charged bodies approach. The force in any direction acting on a charged body will be equal to the algebraical sum of the components, resolved in that direction, of the tensions exerted by the lines of force on that body. Hence if at any point of a body the lines of force are caused to leave it approximately parallel, there will be an excess of force in that direction over any other; and since lines of force leave a conducting surface normally, it can easily be seen that if the conducting surface be curved this condition requires that the lines of force must be most crowded where they are most nearly parallel.

A few of the most important problems in statical electricity will now be considered.

1. *Two bodies charged equally, either with the same or opposite electricities.*—This problem has been considered previously. The student should carefully bear in mind not alone the *shape* and *position* of a line of force, but also its *direction*. If we define the direction of a line of force at any point as that in which a + charged body would tend to move if placed there, we must consider lines of force to *leave* the + charged body, and *enter* the — charged body.

2. *An uncharged conductor placed near a charged one.*—Part of the lines of force, leaving the + charged body A (Fig. 1), will pass

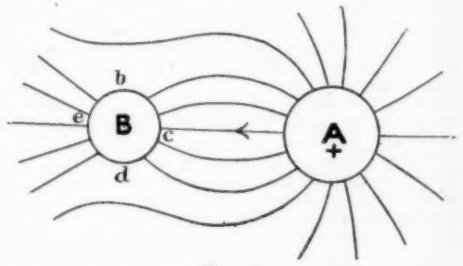


FIG. 1.

through the uncharged body B. Notice that each line entering B on one side, leaves it on the other. Consequently the side *bcd* of B will be negatively charged, whilst the side *bed* will be positively charged to the same extent. All these lines of force will ultimately end on the walls of the room, etc.

All the lines of force, whether leaving or entering B, will tend to contract along their lengths. To determine whether B will be attracted to the right or to the left, we must find out whether the lines of force entering or issuing from B approach most nearly to parallelism. If B be placed very near a wall of the room (supposed

to be to the left of B), then the lines of force on the side *bcd* will be more nearly parallel than those on the side *bcd ;* B will therefore be attracted toward the wall. If it is allowed to touch the wall, all the lines leaving B will cease to exist. B will now have only lines entering it, and will consequently be charged negatively.

Fig. 2 shows a somewhat similar case, a + charged disc of metal A (shewn in section) being brought near to an uncharged gold leaf

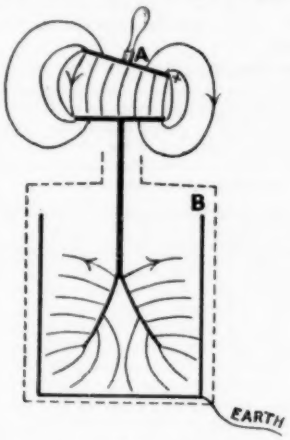


FIG. 2.

electroscope, the leaves being surrounded by, but insulated from, a metal cylinder B, which is connected to earth. In this case the cylinder is of the same potential as the earth, being connected with it; in other words, the cylinder is at *zero potential.* Since, however, lines of force pass from the gold foil leaves to the case, *i.e.* a positive charge of electricity would move in that direction, the leaves are at a higher potential than the cylinder. This is not, however, a necessary condition ; for if lines of force left the enclosing cylinder and ended in the gold leaves, the latter would still be separated. This might be brought about by insulating and charging the enclosing cylinder, and connecting the leaves of the electroscope to earth.

3. *A body* A *charged positively, and another* B *negatively ; the charge on* A *being numerically greater than that on* B.—The disposition of the lines of force in this case is shown in Fig. 3. If A and B were equally but oppositely charged, every line leaving A

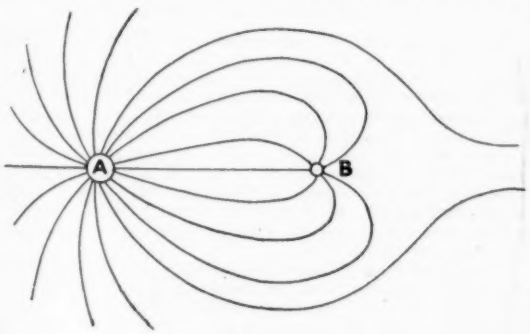


FIG. 3.

would end on B. If now A alone be further charged, no extra lines will enter B. The cause of the extra attraction is to be found in the fact that the greater number of lines leaving A, and proceeding towards the right, tend, by the repulsive action at right angles to their length, to reduce the original lines extending between the two bodies more nearly to parallelism.

4. *The inverse square law.*—This law, which is founded on experimental evidence, and substantiated by the agreement of calculations based upon it with the results of experiments, states that the field around a charged body varies inversely with the square of the distance. It must be remembered that when two bodies, equally charged with the same electricity, repel each other when placed at the distance of 1 cm. apart in air with a force of 1 dyne, each is said to have unit charge. Further, that the strength of field at any point near a charged body is measured by the force exerted on a unit + charge at that point. If now we suppose that the field, as above defined, in a direction perpendicular to a small element of surface, is equal to the number of lines of force passing normally through that surface, we can obtain a theoretical basis for the inverse sq. law. For if the field at a distance r_1 from a charged sphere be equal to F, then, since F will be the number of lines of force passing normally through 1 sq. cm. of the surface of the sphere of radius r_1, then the total number of lines of force passing through that surface $= 4\pi r_1^2 \times F$.

Since each of these lines of force is continuous, and radiates normally from the surface of the above sphere, $4\pi r_1^2 F$ will be the total number of lines of force passing through *any* spherical surface concentric with it. Take a sphere of radius r_2, and let f be the strength of field at a point on its surface. Then $4\pi r_2^2 f$ will equal the total number of lines of force passing through it. Hence

$$4\pi r_2^2 f = 4\pi r_1^2 F ;$$
$$\therefore \frac{f}{F} = \frac{r_1^2}{r_2^2},$$

that is, the field, at any distance from a charged body, varies inversely as the square of the distance from that body.

If the sphere be small and has unit charge upon it, since, according to our definition, the field at 1 cm. distance from it must consist of 1 line per sq. cm., the total number of lines of force leaving unit charge must equal $4\pi \times 1^2 \times 1 = 4\pi$ lines of force. This result is very important. If the body be not a sphere, 4π lines of force will still radiate from it in some manner if it possesses unit charge. The way in which they radiate, and the form and position that the lines take up, will vary with circumstances.

5. It is found that the force exerted between two charged bodies varies with the medium in which they are immersed.

We could hardly suppose that this was brought about by diminishing the *number* of lines of force issuing from or entering either of the bodies ; and since the same action takes place however large the boundary of the medium may be, it is difficult to imagine how it could alter the disposition or direction of the lines. Consequently the only explanation left for us, is that the medium alters the contractile force of each line.

The law of force between two charged bodies may now be expressed by—

$$f = \frac{1}{k} \frac{q_1 q_2}{d^2},$$

where f = the force (in dynes) between the two bodies,
q_1, q_2 = the quantities of electricity on the respective bodies.
d = distance between bodies.
k = specific inductive capacity, or di-electric constant, of the medium in which the bodies are placed.

Questions.

1. It is found that two small spheres, of equal sizes, one of which, after having ten units of electricity communicated to it, is put momentarily in connection with the other, repel each other with a force of five dynes when placed two cms. apart in a certain medium. What is the specific inductive capacity of the medium? In what ratio is the contractile force of each line of force altered with respect to what it would have been in air?

2. A common electrical toy consists of a paper butterfly which is suspended by a long thread between two metal knobs, one of which is charged, the other being connected to earth. Explain why the butterfly moves backwards and forwards between the knobs, touching each in succession?

3. If a basin of melted sealing-wax is kept strongly electrified, fine fibres of the wax are continually shot out. Why is this? What would happen if you brought your hand near the basin?

ENTIRELY NEW OBJECT LESSON SUPPLEMENTS, BEAUTIFULLY PRINTED IN COLOURS, will be presented with many of our issues during 1897. Will our Readers kindly make this known to their professional friends?

NOTES ON PHYSIOGRAPHY.

Uranus and Mercury.

HERR LEO BRENNER has been making some interesting observations on the planets Uranus and Mercury. As regards the first of these bodies he has, with his 7-in. Reinfelder refractor, observed on twelve evenings (April 28th to July 9th) and made the same number of drawings. The spots on the disc are, as he says, the dimmest he has ever seen on a planet's disc ; but, nevertheless, he has made a rough determination of the planet's time of rotation, the reduced value being about eight hours. The planet was also noticed as being flattened at the poles, thus corroborating previous observations. The observations of Mercury, which are illustrated by twenty drawings, indicate a comparatively greater amount of detail than one would expect. The drawings show that the movements of the surface markings are really the result of rotation, the value of this latter being about thirty-three to thirty-five hours. Herr Brenner says, with regard to the longer period suggested by Schiaparelli, that 'so far I am perfectly certain that a rotation of about three months is quite out of the question.' The drawings, he further remarks, indicate on single days distinct forward motions of the spots, the different appearances of the planet's disc at various times, the undoubted polar spots, and, further, the circumstance that the markings seen by him do not always assume the same positions as those seen by Schiaparelli and recorded on his chart. There seems, however, to be evidence that in some cases the spots seen by both observers are permanent workings, as is shown by a comparison of these drawings with Schiaparelli's map of 1890. Herr Brenner has also examined Professor Vogel's drawings of Mercury, which he finds prove the accuracy of his (Brenner's) observations, and suggest the impossibility of slow rotation.

The recent Bog Slide at Knocknageeha.—Mr. Cole, in *Nature*, discusses this interesting catastrophe. He contends that the phenomenon is comparable with surface-creep, which is illustrated by the stone rivers of the Falkland Isles, and the landslides of the taluses of the Tyrol. The ridging of soils upon steep hill sides is a well known and milder form of the sliding motion, and a field laid out on the slope in an even moderately rainy climate, may be considered as always advanced to at the upper end and carried away downhill at the lower. In peat bogs the water finds its way out in numerous channels into the main stream of some neighbouring valley ; and the banks of these valleys are always in a state of flux.

During stormy weather the black saturated lower layers of the bog are washed out in far greater quantity than the brown and dried upper layers. Rifts and signs of movement in the latter will then readily occur. As Sir R. Griffith pointed out in 1821, there is little cohesion between the water-logged lower layers and the impervious clay or other material which underlies the whole, and which allows, in the first instance, of the accumulation of the bog. The moving bog of King's County was accounted for by the occurrence of a dry season, during which extensive cuttings were made, giving a face of 30 feet. The pulpy lower layers were thus reached and were set free, carrying away the upper masses on their surface. The process is analogous to that which forms caverns in many lava flows, the fluid lower portions becoming liberated and rushing out from the upper part. Similarly the deep cutting of the bog of Knocknageeha may have been injudicious in so wet an area. But the immediate cause of the flow seems to have been the heavy rainfall of December 1st, which raised the level of the water in the workings and the level of saturation in the bog. Even in broad daylight it would have been impossible to check the movement when once the King's William Town Road had been overpoured. The slope on which the bog moved, making in the first mile an approximate allowance for the original thickness of the peat in Knocknageeha, falls about 120 ft. in the first mile, 100 ft. in the second, 95 ft. in the third, and 45 ft. in the fourth. The fall of the valley flow as far as Annah Bridge is thus about 100 ft. per mile, decreasing rapidly below the bridge ; and it may be remembered for future guidance that this fall is sufficient to allow of a bog slide of a truly catastrophic character.

Red Rain at Bizerte, Tunis.—The *Revue Scientifique* gives a note on the red rain observed by M. Ginestons on the 4th Nov. last at ten minutes past eight in the morning. The solid matter was almost entirely mineral, if we except the remains of diatoms and rhizopods. There was no trace of calcareous substances, silica being the predominant substance. Transparent crystalline grains with broken edges and angles were found, in which bi-pyramidal quartz was recognized. The colour, however, was due to certain grains coloured rosy red, which, upon examination, were found to consist of pegmatic granite.

Earthquake in Scandinavia.—On Dec. 14th, at 9 a.m., the coast to the south of Norway near to the Swedish frontier, experienced earthquake shocks, which were in a direction east to west. Many houses were wholly or partly destroyed. On the 13th of the same month shocks were also felt at Karlstad in Sweden at 8.30 a.m. extending over about twenty seconds of time, the direction on this occasion being from south-east to north-west.

The Karrenfelder and Erosion of Limestone Rocks.—On high mountains the limestone rocks that are exposed to the atmosphere take very peculiar shapes. This is caused partly by the chemical decomposition of the rocks due to the water that settles upon them, and partly to erosion, particularly where snow lies for a long time on gentle declivities and ridges, near the snow line, and thaws gradually. In the Alps, at the height of 5,200 ft., and even between 6,200 ft. to 8,500 ft., we often see bare rocks extending almost horizontally for long distances which are badly furrowed and crossed by deep washed-out channels, so that they look like the surface of a stormy sea that has been petrified suddenly, leaving stone peaks where the waves had been. They are known locally as Karrenfelder. Over them it is difficult to make much way. The rocks between are sharp, and are cut by cross fissures, which cause them to resemble a comb with broken-off irregular teeth. They constitute a stone sea of splinters and teeth full of bizarre forms that frequently remind one of glacial needles.

There are in these rocks many deep holes like the craters of volcanoes and steep passages that are lost in the depths, and broad kettle-like basins, the bottoms of which are perforated like sieves. Although chaos generally reigns in such a place, sometimes it seems as if active law had governed the erosion, giving the formation such a strong resemblance to the honeycombs in beehives that the herdsmen call them 'Steinwaben,' or stone-combs. The whole thing is a picture of the most terrible destruction on a small scale.

All this is the result of disintegration, of imperceptible but effective wearing away by water from the glaciers, snow, and rain, by the scorching of the sun, which makes the rocks brittle, and by freezing that causes the rocks to crack and split off. In fact it is the result of the exposure of the stone to the atmosphere. The solubility of the stone (in water containing carbon-dioxide) which causes the formation of the furrows is another matter, and the Karrenfelder are generally formed of soluble stone.—*Scientific American.*

The Earthquake of December 17th.—Professor Lobley, F.G.S., discusses in *Knowledge* this all important physiographic occurrence. 'A movement of the rocks of the globe may be produced by several causes, and undoubtedly volcanic action is one of these causes. But a volcanic earthquake takes place in volcanic regions, where volcanic activity has successfully asserted itself and a volcano has been established. Thus the earthquakes of a volcanic region are consequent upon volcanic action, and not the cause of it. But the causes of the earthquakes of non-volcanic regions, such as are the British Islands at this epoch, are non-volcanic, and must be consequent upon forces that are acting independently of volcanic action.

'The surface rocks of the globe in every region, volcanic or non-volcanic, it is obvious, must be affected by those cosmic agencies that disturb the normal condition of their foundation—the underlying rocks. Increase and decrease of temperature, causing expansion and contraction, are such disturbing agencies, and increase of temperature is caused by chemical action, which may be commenced, stimulated, and retarded or suppressed by decrease or increase of pressure resulting again from meteorological or subterranean varying conditions.

'Earthquakes may be considered to be merely the expression at the surface of deep-seated disturbances, the normal results of normal agencies. The wonder is, therefore, that they are not more frequent. That of Dec. 17th affected England along the strike of the Upper Palæozoic and Secondary Rocks, the older Cambrian and Silurian areas escaping, and also the Essex Tertiary area that suffered in 1883. The shocks were non-devastating in their character, and thus differ entirely from the cataclysmic shocks which, judging from the excessive faulting and fissuring of the older Palæozoic rocks, must have been the normal accompaniment of ancient shocks, when geological conditions were not so favourable to surface stability as is now happily the case in these islands.'

MATHEMATICS.

STAGES 2 AND 3, SCIENCE AND ART DEPARTMENT.

BY G. A. BAXANDALL,

Assistant, Mathematical Division, Royal College of Science, London.

STAGE 3.

(Continued from December number.)

49. In the expansion of $(1-7x)^{\frac{-11}{4}}$ when $x = \frac{1}{8}$, write down (1) the $(r+1)$th term in its simplest form and deduce from it the rth, (2) the ratio of the $(r+1)$th to the rth term. By examining this ratio see which is the numerically greater term, the 5th or the 6th, the 9th or 10th, the 13th or 14th. Equate the above ratio to unity and solve for r. Show that by adding unity to the integral part of this value of r we get 13, the number of the greatest term in the expansion.

Ans. $(r+1)\text{th} = \dfrac{11.15.19.....(4r+7)}{4\lfloor r}\left(\frac{1}{8}\right)^r(-1)^r$;

$$\frac{(r+1)\text{th}}{r\text{th}} = \left(1+\frac{7}{4r}\right)\frac{1}{8}.$$

50. By observing the difference between consecutive numbers in the following series, write down the nth term in each; also sum each series to n terms :—

$$1+5+13+29+61.....$$
$$2+6+14+30+.....$$
$$1+3+7+15+31.....$$

Ans. $2^{n+1}-2$, $4(2^{n-1}-1)$, 2^n-1;

$4(2^n-1)-3n$, $4(2^n-1)-2n$, $2(2^n-1)-n$.

51. If a, b, c be in G.P., show that $\log_a n$, $\log_b n$, $\log_c n$, are in H.P.

Trigonometry.

Ex. 38 (*November*).—$\sin\theta.\cos(\beta-\theta) = \cos(90-\theta).\cos(\beta-\theta) = \frac{1}{2}\cos(90+\beta-2\theta) + \frac{1}{2}\cos(90-\beta)$, which is greatest when $90+\beta-2\theta = 0$, *i.e.* when $\theta = 45^\circ + \frac{\beta}{2}$.

Ex. 39 (*November*).—From the first equation $2m\sin\theta\cos\theta = n\sin\theta$, or $\cos\theta = \frac{n}{2m}$. Put this in equation (2) after writing $2\cos^2\theta - 1$ for $\cos 2\theta$.

Ex. 40 (*November*).—Multiply the left-hand side out and equate the coefficients of like powers of x. That is, put (coefficient of x^2) = 1, (coefficient of x) = -2, and $8\cos\frac{2\pi}{7}\cos\frac{4\pi}{7}\cos\frac{6\pi}{7} = -1$.

Each left-hand side of these three equations admits of being split up into the sum of a series of cosines, the angles of which are in A.P.; these can, therefore, be summed by methods already referred to.

Work the following :—

41. Eliminate θ and ϕ from the equations—

$\cos\theta + \cos\phi = a$; $\quad \cot\theta + \cot\phi = b$;

$\operatorname{cosec}\theta + \operatorname{cosec}\phi = c$.

(*See* 'Query Column,' December.)

42. Prove that—

$$\sin^4\frac{\pi}{8} + \sin^4\frac{3\pi}{8} + \sin^4\frac{5\pi}{8} + \sin^4\frac{7\pi}{8} = \frac{3}{2}.$$

43. Eliminate θ and ϕ from the equations—

$a^2\cos^2\theta - b^2\cos^2\phi = c^2$; $\quad a\cos\theta + b\cos\phi = r$;

$a\tan\theta = b\tan\phi$.

44. Prove that $\sin^2\left(\frac{\pi}{8}+\frac{A}{2}\right) - \sin^2\left(\frac{\pi}{8}-\frac{A}{2}\right) = \frac{1}{\sqrt{2}}\sin A$.

45. If $A = 460^\circ$, prove that—

$$2\cos\frac{A}{2} = -\sqrt{1+\sin A} + \sqrt{1-\sin A}.$$

46. Prove that $\sin\frac{\pi}{10}\sin\frac{13\pi}{10} = -\frac{1}{4}$.

47. In any triangle if

$$\tan\frac{A}{2} = \frac{5}{6},\ \tan\frac{B}{2} = \frac{20}{37},$$

find $\tan\frac{C}{2}$, and prove that in this triangle $a+c = 2b$.

Euclid.

Candidates for Stage 3 should carefully read up such subjects as loci, maxima and minima, pole and polar, radical axis and radical centre. The following may be read with advantage :—

Hall and Steven (Books I. to VI.). At the end of Book I., Introductory and Sections IX. and X. End of Book III., the worked examples 35, 36, 37, and Section V. End of Book VI., Sections III. (omitting 4) and IV.

Todhunter, Appendix, 17–22, 35–40, 44, 47–51.

Nixon, 'Euclid Revised': Loci, pp. 173, 174; Maxima and Minima, p. 301, Theorems, 1–16.

STAGE 2.

Algebra.

Ratio, Proportion, and Variation.

Read Chapters XXXII., H.K., *or* Chapters XXVII., XXVIII., and XXIX., H.S.

We may here briefly refer to some of the more important points :—

First.—The student must be able to explain in his own words the meanings of the terms *ratio; duplicate, triplicate,* and *subduplicate* ratio of $a : b$, and what is meant by compounding two or more ratios. Again, he must know the test for *four* quantities being *in proportion* or *proportionals;* also what is meant by quantities being in *continued proportion.*

Second.—He need not try to remember what is meant by such terms as *ex æquali, componendo,* etc.; but it is useful to be familiar with the *dodges* to which these terms refer.

Third.—If two or more equal fractions be given, and other relations require proving, be ready to put each fraction equal to a constant, k, say. A student cannot afford to disregard this artifice.

Fourth.—If a quantity a varies as another quantity b, we may write $a \propto b$, but it is better to always write $a = mb$, where m is a constant whose value remains to be found from additional information, which, in examples, is often supplied by the second statement of the example. Observe that this is often the case in the examples which you work out.

Work several examples selected from each of the sets to be found in the chapters referred to above, also from H.S., p. 137. Also the following:—

37. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, prove that

$$ace : bdf = la^3 + mc^3 + ne^3 : lb^3 + md^3 + nf^3;$$

also that

$$ac + ce + ea : bd + df + fb = pa^2 + qac + rc^2 : pb^2 + qbd + rd^2.$$

38. If $a : b = c : d$, and $p : q = r : s$, prove that

$$ap + cr : bq + ds = \sqrt{acpr} : \sqrt{bdqs}.$$

39. Given that y is equal to the sum of two quantities, one of which varies as x, and the other varies inversely as x^2; and when $x = 1$, 2, $y = 6$, 5, respectively; find the equation between x and y. Ans. $y = 2x + \frac{4}{x^2}$.

40. If $a + b \propto a - b$, prove that $a^2 + b^2 \propto ab$.

41. If $ax + by = cx + dy$, prove that $x \propto y$.

42. If $\frac{x}{q+r-p} = \frac{y}{r+p-q} = \frac{z}{p+q-r}$, show that

$$(q-r)x + (r-p)y + (p-q)z = 0.$$

43. If cricket bats are purchased at 8s. each, at what price each must they be sold, so that the money got for ten bats is equal to the gain on £100? Ans. 8s. 4d.

Trigonometry.

In the following example, a, b, c, are the sides of a triangle, and A, B, C, the opposite angles. Also $s = \frac{1}{2}(a+b+c)$.

50. One angle of a triangle is 50°, and one-half of the difference of the other two is 15°, find the other angles.

Ans. 80°; 50°.

51. Having given that $\frac{\sin A}{\sin B} = \frac{a}{b}$, substitute C for B, and find sin C if $a = 4$, $c = 3$, $A = 60°$. Similarly, find sin B if $C = 15°$, $b = 8$, $c = 2(\sqrt{3}+1)$.

Ans. $\frac{3\sqrt{3}}{8}$; $2\sqrt{2} - \sqrt{6}$.

52. A person, in trying to write down from memory the data of an example which he had seen in a book, puts $a = 20$, $c = 10$, tan $C = \frac{3}{4}$; show that he has made a mistake somewhere. He afterwards finds that the only error is in the value of c. What is the least value of c consistent with the problem being possible? Use a figure to illustrate this. Ans. 12.

53. Show that L sin 147° 45′ = L cos 57° 45′ = L sin 32° 15′, and also that
L tan 22° 35′ = L cot 67° 25′ = L tan 202° 35′.

54. If $x = \sin 122° 40'$, $y = \tan 56° 25'$, $z = \cos 72° 18'$, find the values of log xyz, log $\frac{xy}{z}$, log $\sqrt{xyz}$, and hence find the value of xyz. Given L cos 32° 40′ = 9·9252218, L cot 33° 35′ = 10·1778455, L sin 17° 42′ = 9·4829208, log 3·8547 = ·5859906, log 3·8546 = ·5859793.

Ans. 1·5859881; ·6201465; 1·7929941; ·385468.

55. The sides of a triangle are in the ratio of 4, 5, 7; if C be the largest angle, show, by using the formula $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$, that

$$\tan C . \tan 30° . \cos 15° + \sqrt{3} + 1 = 0.$$

56. Having given that $\tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$, find $\tan \frac{A}{2}$ when $s = 18$, $a = 2b$, and $3b = 2c$. Determine A, having given log 2 = ·3010300, log 3 = ·4771213, L tan 52° 15′ = 10·1111004, L tan 52° 14′ = 10·1108395. What will B and C each be if B is two-thirds of C?

Ans. $\frac{\sqrt{15}}{3}$; 104° 28′ 39″; 30° 12′ 32·4″; 45° 18′ 48·6″.

CHEMISTRY NOTES.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),

First Class Honoursman in Chemistry (Science and Art Department), Head Master, Finchley Organised Science School, and Lecturer therein on Chemistry.

Neutrality of Salts and Coloured Indicators.—In *Comptes Rendus*, M. H. Leschœur makes some interesting observations upon this important topic. Approaching from the historical standpoint, the author remarks that bases were defined as bodies, which (1) turn syrups of violets green, (2) redden turmeric paper, (3) turn red litmus blue, whereas acids were defined as capable of reddening blue litmus. The combinations of acids and bases which neither redden blue nor blue red litmus were defined as *neutral salts*. This is the present practice, to which it is objected that certain salts, as zinc sulphate, redden blue litmus, and are thus not neutral bodies or salts according to the above tests.

This led Berelius to suggest that these signs of neutrality should be regarded as applicable only to the sodium and potassium salts, the question of neutrality or the reverse with respect to salts of other bases being settled by analogy of the corresponding sodium salts. The neutral sulphates will thus be those which, like sodium sulphate, contain three times as much oxygen in the acid as in the base, *e.g.*, Na_2O, SO_3, CuO, SO_2.

The root of this apparent contradiction is a misapprehension which a study of litmus will lay bare.

Litmus contains a red colouring matter which, when brought into contact with alkalies, forms a blue coloured substance with them. In pure water or in acids this red substance remains red; in the presence of an alkali it will be red. In the presence of an insoluble base the indicator may remain red, as in the case of alumina; or it may yield compounds violet in colour either slightly soluble or quite insoluble, the solution being either discoloured or more often rose-coloured.

If we pour alkali into a solution containing an insoluble base and excess of a mineral acid, to which litmus has been added, as the medium changes from acidity to alkalinity the colour varies from red to blue. As the blue colour does not indicate neutrality but alkalinity, and the change does not take place at the moment of neutralisation, and for the most part between the moment when there is free acid and that when the alkali is in excess, the litmus passes through all the shades intermediate between red and blue, and from what has been said it may be inferred that a red colouration, so far from indicating acidity, may indicate neutrality. This ambiguity M. Leschœur would remove by the employment of phenolphthalein and helianthine.

Phenolphthalein is colourless and yields *red compounds with the alkalis*. It does not combine with insoluble metallic oxides. If poured into a medium containing excess of acid and an insoluble base, to which is added an excess of alkali, the solution is colourless so long as the acid remains in excess. When this is neutralised and the oxide commences to precipitate, the solution still is colourless, nor does the red tinge appear until alkali is present in excess. Wherefore phenolphthalein by change of colour merely indicates alkalinity and not neutrality, the indication being, however, much more decided than in the case of litmus.

Helianthine is colourless in a neutral or in an alkaline solution. In the presence of acids it turns red. If into the solution containing a metallic oxide and free acid in excess we pour an alkali, helianthine being present, the solution is at first rose-coloured, then yellow, when all the acid is neutralised. Helianthine then indicates the passage from the acidic to the neutral state, and is thus opposite to litmus and phenolphthalein.

Hence the red of phenolphthalein or the blueness of litmus will indicate the presence of free alkali; the rose colouration of helianthine will indicate the presence of free acid, and a combination of the two tests will constitute a reliable indication of neutrality, and the anomalous cases will be found to disappear under this mode of procedure.

Pettenkofer's Method for determining the amount of CO_2 in Air.—Professor Letts, D.Sc., and R. F. Blake, F.I.C., draw attention to an error in this mode of determination by absorption in baryta water. The alkaline absorbent is proved to act upon the glass and so vitiate the determination.

This source of error is eliminated by the simple expedient of coating the vessels containing the air and the absorbent with paraffin wax, which prevents the action of the alkaline solution upon the glass. The observers bear witness to the extreme delicacy of Pettenkofer's method when this simple safeguard against error is employed.

Lucium not an Element but Impure Yttrium.—Professor W. Crookes, F.R.S., has examined specimens of the alleged new element lucium, and by spectrum analysis has conclusively shown that the substance yields all the lines indicative of yttrium and no new lines whatsoever, hence the conclusion referred to above.

Litmus: Determination of its Colouring Power.—E. Dieterich has put forth the following simple method of determining the colouring power of litmus. He grinds up 5 grms. of litmus with 80 c.c. of water, and rinses the whole into a 100 c.c. flask, wherein it is digested for two hours at a temperature of 50°C, after which the contents are allowed to cool and settle prior to filtration: ·05 c.c. of the filtrate are diluted with 100 c.c., which should appear distinctly coloured when seen from above in a stratum of 20 cm. in thickness.

Volumetric Work for Elementary Students.—The *Chemical News* for January 15th contains an article from the pen of Mr. W. Ackroyd, F.I.C., in which the writer outlines a neat exercise in volumetric quantitative analysis, which will be read with interest and probably adopted by those of our readers who have to teach Chemistry.

'a' c.c. of aqueous H_2SO_4 are found to be neutralised by 'b' c.c. of solution of NaHO.

To 'a' c.c. of the acid a weighed quantity of Mg is added (from 0·1 to 0·2 gm.), and when all action has ceased, 'b' c.c. of the alkali are added. The indicator used (methyl orange) shows that all the free acid has been neutralised, and it may readily be proved that all the metal is precipitated as hydroxide. Now run in from the burette H_2SO_4 of known strength, until the magnesium hydrate is exactly neutralised.

From the data thus obtained the equivalent of H_2SO_4 may be calculated.

The writer further suggests the following four exercises in obtaining equivalents:—

1. Determination of the Mg equivalent by finding what weight of it is required to liberate 11·6 litres of H at normal temperature and pressure.

2. Determination of the O equivalent by finding how much of it combines with 12 grms. of Mg in the course of the ignition of the latter in a porcelain crucible.

3. Determination of the H_2SO_4 and HCl equivalents, by finding what weight of each is reguired to neutralise the hydroxide formed from 12 parts by weight of Mg.

4. Determination of the equivalent of caustic soda by finding what weight of it neutralises an equivalent of H_2SO_4.

The writer wisely proceeds to insist that the unit equivalent of H should be accepted in these elementary determinations as the standard of comparison.

Acetylene and Calcium Carbide.—Students interested in the manufacture of the illuminant acetylene from water by the agency of calcium carbide, will find an exhaustive account of the manufacture of the carbide in the last three or four numbers of the *Chemical News*. The account is much too lengthy for condensation here.

Artificial Diamonds.—Of the three allotropes of carbon, diamond is by far the most wonderful. The proof of the carbonaceous nature of diamond, until M. Moissan commenced his experiments, consisted, as is well known, in the fact that when burnt in oxygen carbon dioxide resulted.

Now M. Moissan, by the aid of his electric furnace, has succeeded in forming diamonds, very small, it is true, but with the same characteristics as naturally occurring specimens, artificially. In the proceedings of the Chemical Society the following account of this operation appears. Iron was carburetted and fused in the electric furnace, and allowed to fall into mercury 10 centimetres deep covered with water 20 centimetres deep. The irregularly shaped granules thus produced were saturated with carbon; but contained none of a high specific gravity. The spheres or ellipsoids formed at the same time, however, contained both black and transparent diamonds, some of which, although microscopically small, showed a remarkable regularity of crystalline form.

Larger specimens of the fused carburetted iron were allowed to fall into water and mercury at the bottom of a shaft 32 metres deep; but the conditions of the experiment were not favourable to the production of sperical masses of iron. It was observed that when the falling globules touched the tub containing the mercury, or came into contact with the earth, they broke up, with a flame, into scintillating globules, the change being accompanied by a report like that of a rifle. It was also observed that even during the short time occupied by the fall, the temperature of the globules was materially reduced. In other experiments the fused carburetted iron was run into a small cylindrical cavity in a large mass of iron or copper. Under these conditions the fused metal is very rapidly cooled, and the diamonds are obtained mixed with graphite; but the yield is not very satisfactory.

Black Diamonds.—M. Moissan has had under experiment the so-called black diamonds of Brazil, which consist of transparent diamonds with enclosures of a black substance.

M. Moissan has established the interesting fact that this black substance consists of carbon of a different variety from that composing the diamond itself, for when a black diamond is heated at 200° below the temperature at which the diamond itself combines with oxygen to form carbonic anhydride, the black substance disappears and carbonic anhydride appears, the diamond itself becoming transparent.

Lithium Nitride.—This, the only nitride capable of formation at ordinary temperature and pressure, has lately formed the object of interesting experiments by M. Guntz, who finds that the heat of formation of the nitride is 49·5 calories, whilst that of lithium hydroxide is 65 calories. It follows from this that hydrogen should be capable of decomposing the nitride, with the formation of lithium hydride, and such, indeed, upon experiment, was found to be the case; furthermore, the reaction can be reversed, since at high temperatures a stream of nitrogen converts lithium hydride into lithium nitride.

THE CAUSES OF THE GLACIAL EPOCH.—Professor Hall suggests a fresh probable cause of the Glacial Epoch. Considering the effects that would be produced on the Gulf Stream by the uprising of a submerged Antillean continent, he maintains that the current would thereby be forced to flow directly northwards into the North Atlantic, and would be deprived of about ten degrees of heat. By the increased snowfall that would thereby be caused over certain areas, the cold through all the adjoining tracts would be intensified, and at the same time the glaciation caused would be intensified by the elevation of the land of eastern North America, and to an elevation of North-western Europe, which is supposed to have occurred at the end of Pliocene times.

NOTES ON THEORETICAL MECHANICS.

ADVANCED AND HONOURS STAGES.

BY F. CASTLE, M.I.M.E.

Royal College of Science; Lecturer in Mechanics, Geometry, etc., Morley College, London.

(*Continued from p.* 364.)

40. A mass of 100 lbs. rests on a plane which is made to move upwards or downwards with an acceleration of 4 ft. per sec.; find the pressure exerted by the mass on the plane and the time required to move through 450 ft. Ans. 112½ lbs.; 87½ lbs.; 15 secs.

The equations established in the preceding notes are of fundamental importance in dynamics, and the student should be able not only to obtain them readily, but should make himself so familiar with them that he is able to solve examples with facility; it may be convenient to bring them together here for reference, and they should be carefully made out and remembered.

$$F = mf\ ;\ Ft = mv\ ;\ Fs = \tfrac{1}{2}mv^2.$$

$$v = V \pm ft\ ;\ s = Vt \pm \tfrac{1}{2}ft^2\ ;\ v^2 = V^2 \pm 2fs.$$

Examples will often be met with which require for their solution several of the above equations; the following worked example will show how they may be applied.

41. Two scale-pans, each weighing 3 lbs., hang (at rest) at the ends of a cord passing over a pulley. A weight of 2 lbs. is placed in one of the pans. Neglecting the friction and inertia of the pulley, find how far that pan will descend in five seconds. What will be its velocity at the end of that time, and with what force does the 2 lb. weight press upon it. ($g = 32$). Ans. 100; 40; 1¾ lbs.

Solution. $f = \frac{2}{8}g = \frac{1}{4}g$,

$$s = \tfrac{1}{2}ft^2,\quad \therefore s = \frac{g}{8} \times 25 = 100 \text{ ft.}$$

$$v = 8 \times 5 = 40.\quad P = 2(1 - \tfrac{8}{32}) = 1\tfrac{3}{4} \text{ lbs.}$$

42. A body in motion is observed to increase its velocity in every second by 5½ ft. per sec.; how far would it move from rest in 12 seconds? If the body has a mass of 10 lbs., what is the numerical value of the force producing the motion (*a*) in absolute units, (*b*) in gravitating units? ($g = 32$) (1885.) Ans. 384 ft.; 53¾; 1⅔.

43. Two particles, whose masses are P and Q, are connected by a fine thread which passes over a smooth pulley (as in Atwood's machine), so that when P descends it draws Q up. The bodies are allowed to move from a state of rest, and it is found that P falls through 9 feet in the first three half seconds of its motion; find the ratio of the mass of P to that of Q. (1896.) Ans. $\frac{9}{7}$.

44. A particle (A), whose mass is 3, is tied by an inextensible thread to a particle (B), whose mass is 5, and B is placed on a smooth table, while A is allowed to fall from the edge; at first the thread is slack, but at the instant A has fallen 9 feet, the thread is drawn tight; with what velocity does B begin to move?

What part of the kinetic energy of the system disappears when the thread is drawn tight? (1896.)

Solution.

Let V = velocity of A at the instant the thread is drawn tight, then $V^2 = 2gs = 2 \times 32 \times 9$.

$$\therefore\ V = 24 \text{ ft. per sec.}$$

Let v = velocity, with which B will begin to move, then $v(3 + 5) = 3 \times 24$.

$$\therefore\ v = \tfrac{72}{8} = 9 \text{ ft. per sec.}$$

Loss of kinetic energy when thread is drawn tight is

$$\tfrac{1}{2} \times 3 \times 24^2 - \tfrac{1}{2}(5 + 3)9^2,$$

$$= 864 - 324 = 540 \text{ foot-poundals.}$$

45. Two particles of given masses are connected together by an inextensible thread which passes over a smooth point; one of the particles is at rest on a table, while the other descends; find their common velocity the instant after the thread is drawn tight. The mass of the particle at rest is 5 lbs., the mass of the descending particle 3 lbs., and it falls through 10 ft. before the string is drawn tight; how much of the kinetic energy disappears when the thread is drawn tight? (1892.) Ans. 600 foot-poundals.

46. Two bodies, A and B, weighing 10 lbs. and 50 lbs. respectively, are connected by a thread; B is placed on a smooth table and A hangs over the edge; when A has fallen 10 ft., what is the

kinetic energy of the bodies jointly, and what of them severally? How would these answers be affected if the table were rough and if the coefficient of friction between B and the table were 0·1? (1884.)

47. In uniformly accelerated motion show that $s = \frac{1}{2}ft^2$. State exactly what the letters s, t, and f stand for.

If a body moves in a straight line under the action of a force which in every three seconds increases its velocity 8 ft. a second, what distance would it describe from a state of rest in half a minute. (1884.)

48. State the meaning of each letter in the formula

$$v^2 = V^2 + 2fs,$$

and prove the formula.

A particle, whose velocity undergoes a constant acceleration, starts from rest, and after describing 50 feet has a velocity of 20 feet a second; find the increase of its velocity per second and the time in which it describes the distance of 50 feet. (1890.)

Ans. 4 ft. per sec.; 5 secs.

49. Two points, P and Q, moves with different velocities along the same line; what is the relative velocity of Q to P?

If Q is allowed to fall freely, and two seconds after P is allowed to fall freely from the same point, find the relative velocity of Q to P at any subsequent time. (1893.)

50. Prove the formula $s = \frac{1}{2}ft^2$, for the distance described by a particle, whose velocity undergoes constant acceleration.

AB is a given straight line and P a point above it; find the straight line down which a particle would fall from P to AB in the shortest time. (1893.)

51. A particle describes successively the sides of an equilateral triangle with a constant velocity (V); find the magnitude and direction of the velocity (v) that must be communicated to it when it comes to an angular point. Compare the results in this case with those that would be obtained in the case of a regular hexagon. (1892.)

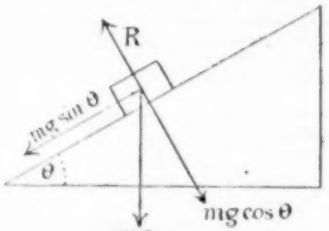
52. State the rule for the composition of two velocities. Draw two lines, AB, AC, containing an acute angle; a particle is at A, moving with a given velocity V from A towards B; give a construction for determining the velocity that must be impressed on it to make it move with a velocity 2V from A towards C. (1894.)

53. A particle describes the perimeter of a regular hexagon with a constant velocity of 100 feet a second; find the magnitude and direction of the velocity that must be communicated to it at the instant it reaches an angular point. (1889.)

Ans. 100 ft. per sec. towards centre of hexagon.

54. Find horizontal and vertical distances described in $\frac{1}{10}$ sec. by a stone let fall from the roof of a railway carriage which is travelling along level rails at 30 miles per hour. Ans. 4·4 and ·16 ft.

Motion on a smooth inclined plane.—Let θ be the inclination of the plane to the horizon. The forces acting are, the weight of the body, and the reaction of the plane; the former, a force of Mg units acting vertically downwards, can be resolved into two forces,



$Mg \sin\theta$ down the plane, and $Mg \cos\theta$ perpendicular to the plane. The component $Mg \cos\theta$ is balanced by R, the normal reaction of the plane; the component $Mg \sin\theta$ is left unbalanced, and produces the motion. Hence if f denote the acceleration down the plane, then—

$$f = \frac{\text{moving force}}{\text{mass moved}} = \frac{Mg \sin\theta}{M} = g \sin\theta.$$

If this value for f be substituted in the three equations, $v = V \pm ft$, $S = Vt \pm \frac{1}{2}ft^2$, $v^2 = V^2 \pm 2fs$, we obtain, $v = V \pm gt \sin\theta$, $S = Vt \pm \frac{1}{2}gt^2 \sin\theta$, $v^2 = V^2 \pm 2gs \sin\theta$, formulæ which are applicable to motion on an inclined plane; where V is the initial velocity of the body, and t the time taken in sliding through a space s along the plane, the upper or plus sign is used when the body is sliding down, the lower sign when the direction of sliding is up the plane; assuming the body to start from rest, if t be the time taken in sliding down a length l of the plane, v the velocity at the bottom, then—

$$l = \tfrac{1}{2}gt^2 \sin\theta.$$
$$v = gt \sin\theta.$$
$$v^2 = 2gl \sin\theta.$$

To find the work done on the body in sliding down a plane of height h.—The displacement of the body is along AC, the direction of the reaction R is at right angles to AC, hence no work is done by the force R; the only force which does work is the weight W; the displacement of the body in the direction of W is h, hence the work done is Wh, or $Mg.h$ (as $l \sin\theta = h$), $\therefore Mg.h = \frac{1}{2}Mv^2$.

Thus a body projected up a plane of height h, with velocity v, would just reach the top; $Mg.h$ being the work done against gravity. The velocity acquired in sliding down the plane is the same as would be acquired if allowed to fall freely through a distance equal to the height of the plane.

To obtain the vertical and horizontal velocities of a body which is moving down an inclined plane of height h and base b, with a velocity v ft. per sec.—If t denote the number of seconds taken to describe the length l of the plane, then—

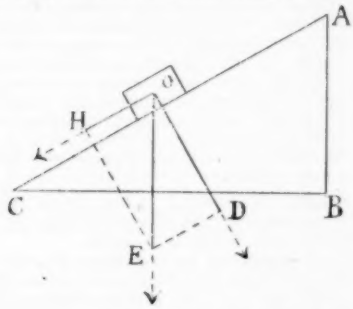
$$\text{Vertical velocity} = \frac{h}{t}.$$

$$\text{Horizontal velocity} = \frac{b}{t}.$$

A rough approximation to the value of g can be obtained by noting the time taken by a body sliding down a length l of a smooth inclined plane; the result however is far from being accurate, owing to the frictional resistances and the difficulty of measuring the time accurately. A better method is by the Atwood's machine or Kater's pendulum; these will be considered at a later stage.

The preceding results can be obtained without using Trigonometry as follows:—

Let ABC be the inclined plane on any convenient scale set off OE to represent g, and resolve into the two rectangular components, OD and OH; that is, draw OD perpendicular to AC, and from E draw ED parallel to AC, intersecting OD at D; completing



the parallelogram, we obtain OH, where OH, to the same scale on which OE represents g, gives the acceleration f. It is easily seen that the triangles OHE and ABC are similar; hence the sides opposite equal angles are proportional to each other.

$$\therefore \frac{OH}{OE} = \frac{AB}{AC} = \frac{\text{height of plane}}{\text{length of plane}};$$

$$\text{hence OH, or } f, = \frac{h}{l}g.$$

The student who knows the values of the trigonometrical ratios for angles of 30°, 45°, and 60°, can easily obtain the value of f when the data given involve one or other of these angles; thus if the inclination of the plane be 30°, then $f = g \sin 30° = g \times \frac{1}{2}$, and the acceleration is $\frac{g}{2}$; similarly for 45° and 60°, the values of f are $\frac{g \times \sqrt{2}}{2}$ and $\frac{g\sqrt{3}}{2}$ respectively.

55. A body slides down a smooth inclined plane, the height of which is 10 ft., the length 100 ft.; find the velocity acquired in sliding from the top to the bottom of the plane, and the time taken from the top to the bottom ($g = 32$).

$$f = g \sin\theta = g\frac{\text{height}}{\text{length}} = \frac{32 \times 10}{100} = \frac{16}{5}.$$

$v^2 = 2fs = 2 \times \frac{16}{5} \times 100$; $\therefore v = 25{\cdot}3$ ft. per sec.

$s = \frac{1}{2}ft^2$, or $100 = \frac{1}{2} \times \frac{16}{5} \times t^2$; $\therefore t = 7{\cdot}9$ seconds.

(*To be continued.*)

REPLIES TO SCIENCE QUERIES.

G.A.A.—Yes, with the aid of a text-book and a good amount of practical work. Dr. Schofield's book, published by Cassell's, we recommend.

Scientia.—We are informed by the U.C.C. that a new and enlarged edition of Stewart's 'Heat' to cover requirements of the Advanced Examination will shortly be issued. It will be well to get this if you can wait a little.

2. Hick's 'Dynamics' is one of the most suitable books for the 'Advanced Solids.'

3. Besant's 'Elementary Hydrostatics' is not sufficient for 'Advanced Fluids,' but this and Hick's 'Dynamics' will answer all your requirements.

4. Wright's 'Heat' will probably be the more useful book of the two. See the 'PRACTICAL TEACHER' for Nov. 1896, p. 298.

Geologist.—You will find Professor Lapworth's edition of 'Page's Geology' (Part I.) answer your purpose. It contains quite enough for the Advanced Course S.K.

Alchemist.—The only double salts of very common occurrence with which you will be required to be familiar are the alums, to which class of double sulphates the question quoted undoubtedly refers. The best book for you is undoubtedly Professor Emerson Reynold's 'Experimental Chemistry, Pts. I.–III., and especially Pts. II. and III. The book is published by Messrs. Longman.

Charles W. Mynn.—Questions and Solutions are published by Messrs. Chapman & Hall, Henrietta Street, Covent Garden, London, W.C.

HYACINTH BULB PACKING AND THE SKIN.—It has been noticed that the unpackers of hyacinth bulbs from Holland frequently suffer from skin irritation, communicated by touching the face with the hands. It has been suggested that in the act of handling the bulbs almost infinitesimal portions of the earth in which the bulbs have been grown attach themselves to the fingers, and are thus conveyed to the face and neck. In the Jodrell Laboratory at Kew a course of experiments has been instituted, from which it appears that both dry and moist scales of the bulbs are capable of causing considerable irritation when applied to the skin, a fact apparently due to the abundance of acicular raphides present. At a recent meeting of the Linnæan Society, Dr. Morris, of Kew Gardens, showed specimens of these needle-like crystals varying from one eleventh-hundredth to one twelve-hundredth of an inch in length. They are arranged in close bundles, which are easily dispersed by rubbing the dry scales. In the growing plant they may be regarded as defensive structures, keeping away snails from the bulbs. The irritation of the skin produced by the contact with the bulb scales of hyacinths is due immediately to puncture by the numerous raphides.

***

THE GROWTH OF DIATOMS.—Mr. Whipple has lately published the results of a series of experiments instituted by him on the culture of different kinds of diatoms. He finds that an abundant food supply is not the only condition favourable for their rapid increase. Temperature, the amount of light, and other factors influence their growth. Diatoms contain chlorophyll and will not grow in the dark. On the other hand, bright sunlight kills them. As a rule they are found most abundantly in light-coloured waters, for the intensity of the light below the surface of the water is affected by the colour of the water. Different genera vary however in this respect; *e.g. Melosira* does not require so much light as *Synedra*. The weather has a decided influence on the growth of diatoms. They increase most rapidly during those seasons of the year when the water is in circulation throughout the vertical. During those periods not only is food most abundant, but the vertical currents keep the diatoms near the surface, where there is light enough to stimulate their growth and where there is abundance of air. Some species show strong heliotropism, moving towards the source of life.

***

A NEW FOOD FOR CATTLE.—M. Paul Gay advocates the use of horse chestnuts as a food for cattle. They are palatable, and do not affect either the richness or the quality of the milk. Their alimentary value is at least three times as great as that of the richest forage beetroot. Pigs, however, appear to dislike the horse chestnut.

***

ROOTS AND RUNNING WATER.—Mr. Newcombe has recently been experimenting on the tendency of roots to move in the direction of running water. He examined seventeen species of Monocotyledons and Dicotyledons, each of which were positively rheotropic (that is, they curved the tips of their roots directly or obliquely against the stream), nine species were indifferent, none were negatively rheotropic. The curvature appears to occur in response to irritation.

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'THE PRACTICAL TEACHER'S LIBRARY.'

V.—APPLIED HISTORY.*

To that form of geographical study which brings into special prominence the bearings of the physical features of the earth on the social and economic conditions of its inhabitants has been given the name 'Applied Geography'; and with this subject an earlier paper of this series was concerned. There is a somewhat similar method of historical study, one which regards the records of the past as the sources whence may be drawn guidance for national policy in the future, and this sort of study it seems reasonable to designate as 'Applied History.' It is a method which is powerfully advocated and strikingly exemplified in two books which we commend to our readers as worthy of a place on a teacher's bookshelves, namely, 'The Expansion of England,' and 'An Introduction to Political Science.' Each of these volumes contains two courses of lectures delivered by the late Sir John R. Seeley in his capacity as Professor of Modern History in the University of Cambridge.

Sir John R. Seeley.

The author of these volumes was born in London in 1834. He was the son of a publisher whose establishment is still well known for its publications on art and other subjects. John Seeley attended the City of London School, and afterwards went to Cambridge, where he greatly distinguished himself in classics. He returned to his former school as a classical master, and later was appointed Professor of Latin in University College, London. When the Professorship of Modern History in Cambridge became vacant in 1869, he received the appointment from the hands of Mr. Gladstone. His work at Cambridge seems to have been of a very thorough-going kind. His weekly lectures usually dealt with special historical subjects; but he also conducted a weekly 'Conversation Class,' in which general questions of political science were discussed in a less formal fashion.

Besides the works under notice, Professor Seeley produced an edition of Livy, a large book on the 'Life and Times of Stein,' and a 'Short History of Napoleon.' He was also the author of 'Ecce Homo' and 'Natural Religion,' two books which occasioned considerable excitement in the religious world, on account of the free—albeit reverent—way in which they treated orthodox religious opinions. The Professor continued to fill his post with eminent ability for twenty-five years, and died about two years ago, shortly after having received the honour of knighthood.

The Place of History in Education.

There are, of course, various views as to the best method of historical study, and also as to its value. Many persons do not consider that it has any particular value at all, but think that the reading of it affords pleasant occupation for leisure hours. To them History is a form of romance with rather more basis of fact than avowed romances profess to have. With such views Professor Seeley has no sympathy. History with him is a serious study, and has incalculable value.

History the School of Statesmanship and of Public Feeling.

In his inaugural lecture in 1869—a lecture not included in the volumes before us—he spoke on the Teaching of Politics. After recognising and regretting that the claims of History are practically little admitted, he goes on—

'Let me say, then, that History is the school of statesmanship. If I were not addressing the students of Cambridge, I might take lower ground. I should rather choose to say, that as in a free country every citizen must be at least remotely interested in public affairs, it is desirable, both for the public good and for the self-respect of each individual, that great events and large interests should make part of the studies which are to prepare the future citizen for his duties, in order that he may follow with some intelligence the march of contemporary history, and may at least take an interest in the great concerns of his generation, even though he may not be called to take any considerable part in them, or to exert any great influence upon them. . . . The most secluded man is living in the midst of momentous social changes, whether he can interpret them or not; the most humble task upon which any man is engaged makes part, even though he forgets it, of a total of human work by which a new age is evolved out of the old; the smallest individual life belongs to a national life which is great, to a universal life of the race which is illimitably great. There are studies which show a man the whole of which he is a part, and which throw light upon the great process of which his own life is a moment; the course along which the human race travels can be partially traced, and still more satisfactorily can the evolution of particular nations during limited periods be followed. Studies like this leave something more behind them than a refinement imparted to the mind, or even than faculties trained for future use; they furnish a theory of human affairs—a theory which is applicable to the phenomena with which life has to deal, and which serves the purpose of a chart or a compass. The man that has even a glimpse of such a theory, if the theory be itself a hopeful one, cannot but feel tranquillised and reassured; his life, from being a wandering or a drifting, becomes a journey or a voyage to a definite port; the changes that go on around him cease to appear capricious, and he is more often able to refer them to laws; hence his hopes become more measurable, and his plans more reasonable, and it may be that where his own efforts fail he is supported by faith in a law of Good, of which he has traced the workings. Such a study—teaching each man his place in the republic of man, the post at which he is stationed, the function with which he is invested, the work that is required of him—such a study is History when comprehensively pursued. History, then, is the school of public feeling and patriotism. Without at least a little knowledge of history no man can take a rational interest in politics, and no man can form a rational judgment about them without a good deal.'

The Teaching of Political Science.

In the passage just quoted seems to lie the germ which in after years was expanded in the courses of lectures first delivered in 1885–6, and published since Professor Seeley's death. Lacking the author's final revision, they have been prepared for the press by his friend, Professor Henry Sidgwick, who, in an editorial preface, explains how he has made use of a shorter course given in 1891 on the same subject, to secure that Seeley's latest views should, as far as possible, be represented in this posthumous publica-

* 'The Expansion of England': Two Courses of Lectures. By Sir John R. Seeley, K.C.M.G., Litt. D.—'Introduction to Political Science': Two Series of Lectures. By Sir J. R. Seeley, K.C.M.G., Litt. D. London: Macmillan & Co.

tion. In the course of this preface he quotes from Mr. Tanner, a former pupil of Professor Seeley's, a passage descriptive of his 'Conversation Class,' which seems worthy of re-quotation :—

'His old pupils carry with them grateful recollections of his "Conversation Class." The subject was Political Science, studied by way of discussion, and discussion under the reverential conditions that prevailed resolved itself into question and answer—Socrates exposing the folly of the Athenians. It was mainly an exercise in the definition and scientific use of terms. What is liberty? Various definitions of the term would be elicited from the class and subjected to analysis. The authors of them would be lured by a subtle cross-examination into themselves exposing their inconsistencies. Then the Professor would take up his parable. He would first discuss the different senses in which the term had already been used in literature. . . . From an examination of inconsistent accounts the Professor would proceed to the business of building up by a gradual process, and with the help of the class itself, a definition of his own. . . It was not told on authority as something to remember, but we assisted ourselves at the creation of it. Thus it became a possession to be enjoyed with a title analogous to the title of authorship. It took an hour to define liberty, but the leisurely process had the highest educational value.'

The substance of such a discussion and such a gradual construction of the definition of the word 'liberty,' is to be found in the fifth lecture of the first series on Political Science. It forms an admirable example of Professor Seeley's method of rigorous analysis, of his application of a remorseless logic, and of his painstaking plan of arriving at accuracy of definition. The conclusion to which this careful examination leads him is thus expressed :—

'We may say, then, that liberty is primarily the absence of restraint, or the opposite of government ; but, in a secondary sense, which is also convenient, it is the absence of excessive restraint, or the opposite of over-government.'

It may be well to assure the reader that Professor Seeley's lectures on Political Science are not political in any party sense. There is nothing in them to offend the sensibilities of political partisans. At the outset he defends himself against a possible objection to his lecturing as a professor of history on this subject; and he does so on the ground that, in his opinion, 'to lecture on political science is to lecture on history.'

'It is my point of departure,' he says ; 'it is the first aphorism in the system of political science which I am about to expound to you, that this science is not a thing distinct from history, but inseparable from it. To call it a part of history might do some violence to the usage of language, but I may venture to say that history without political science is a study incomplete, truncated, as on the other hand political science without history is hollow and baseless—or, in one word :—

'History without political science has no fruit ;
Political science without history has no root.'

What History Is.

'History has usually been taken to be concerned simply with facts. Evidently it would be entirely transformed if we came to consider the facts established by history as mere raw material out of which a science was to be constructed. Such a view would, on the one side, impart a new interest of a very vivid kind to historical research ; on the other hand, perhaps you may think it would deprive history in a great degree of the peculiar charm which it has hitherto possessed. Hitherto there has hung about historical study a delightful atmosphere of leisure and enjoyment; it has had a dainty flavour of romance, curiosity, poesy, which we may regret to see replaced by the potent, pungent, acrid taste of science. Whether the loss would be more than counterbalanced by the gain is a further question ; in any case, the revolution which would take place in the study could not but be momentous.'

Our author goes on to point out that the application of the word history has been gradually narrowed by being appropriated to the record of a particular sort of facts, and that its tendency is continually to lose something of the extent of its application by the appropriation of certain classes of facts by newly developed sciences. Thus he says :—

'History, as the word is now used, is the name of a *residuum* which has been left when one group of facts after another has been taken possession of by some science.'

He even looks forward to the day—

'when the historian will feel himself to be superfluous altogether, when we shall cease to speak of human history as we have already almost ceased to speak of natural history. . . . The old, endless tale will then be told, and history will be swallowed up in science.'

He is careful, however, to explain that he is speaking of history as a grave, serious pursuit, a study for grown men, and not of the eloquent, sympathetic narration of great actions and great events, which will continue to exist, like poetry, as long as human beings exist.

In this way the Professor arrives at the point that the subject matter of his political science is the body of observed and recorded facts respecting states and their development. He then proceeds to distinguish and classify states, and his fourth lecture closes thus :—

'The result, then, is that we have two great classes, and under one of these a fourfold division, according to the importance of local government.

'I.—The city state—local government none.

'II.—The country state :

(*a*) Centralised unitary—local government small.
(*b*) Decentralised unitary—local government considerable.
(*c*) Federal state—local government predominant.
(*d*) System of confederate states—local government all-powerful.'

In succeeding lectures such terms as oligarchy, monarchy, despotism, democracy, aristocracy are subjected to severely logical analysis, and conventional opinions respecting them are unsparingly criticised.

'It is the custom to regard despotism as a sort of unmixed curse, as an incubus or nightmare, as a supernatural evil which, leagued with superstition, crushes the unhappy race of mortals in the dust. This doctrine is the counterpart of that which represents liberty as an unqualified blessing, equally desirable in all times and places. Now there is a sort of despotism as ghastly as this theory imagines ; in inorganic states, where everything is founded on violence and conquest, such horrors are not rare. But we have nothing to do here with inorganic states. The forms of government with which we are concerned have grown up by a reaction of the political vital principle against some pressure. Among these forms is the government of one. By the hypothesis it meets some want ; and in some cases it is obvious that one important want which it meets is the want of protection for the people at large against the tyranny of the few.'

The examples adduced in illustration of this statement are Julius Cæsar and the Roman Emperors, the strong Tudor Kings, the Prince of Orange in the Dutch Republic, the French Monarchy in the thir-

teenth century, and 'the strongest form of despotism which modern Europe has known'—that of the Czar of Russia. In each of these cases the despotic power was supported by the people, because it protected them against tyranny on the part of a class of nobles. At the same time it is recognised that an autocracy is not the ideal form of government, inasmuch as abuse of despotic power can only be kept in check by fear of violence.

'The truth is that all autocracy, at least pure autocracy, is and must be tempered by assassination.'

The remedy lies in the possession by the government-making power of a government-making organ. This we have in England.

'Hardly anywhere do governments fall more frequently or more suddenly than in England. Why, then, do we seem in comparison with most states so exceptionally steadfast and stable? It is not because we do not have revolutions, but because we have reduced revolution to a system and given it legal forms. We have always a revolution, and, therefore, in a certain sense, we never have a revolution.'

A formal theoretic statement of conclusions reached closes the first series of lectures, and this statement is subject to further detailed examination and comparison with historical facts in the second series, which are marked by the earnest truth-seeking spirit, the luminous exposition, and the strictly scientific method which are so conspicuous in the first half of the book. The last lecture gives a rapid sketch of the history of the organic states of the world in the light of the conclusions to which the learned professor has led his students, and concludes with an expression of hope that his lectures may prove as fruitful seed.

'The Expansion of England' was the first published of Professor Seeley's courses of history lectures, but the posthumous volume has been dealt with first, because it contains the fullest and most general statement of the principles of the author's method. This earlier volume supplies an extremely valuable example of the application of the scientific method to a special and important subject of historical study. The professor's conviction as to the rightness of that method was essentially the same from the beginning of his work as a teacher of history. As Professor Sidgwick says in the preface already quoted :—

'He announced it in the inaugural lecture which he delivered on his accession to the Chair of History in Cambridge; and it grew stronger and clearer as years went on, and assiduous study enlarged his knowledge and deepened his insight into the development of historic polity. Indeed, he once said to me that he valued the wide popularity of his *Expansion of England*, not only for the effects that might be hoped from it in furthering practical aims that he had at heart, but also not less because the book seemed to have proved itself a persuasive example of his method: because it had brought home to Englishmen throughout the Empire, that, in order to know what England ought to be and do now, they must study what she has been and done in the past.'

The keynote of his method is struck in the very opening sentences of the first lecture of the course :—

"It is a favourite maxim of mine that history, while it should be scientific in its method, should pursue a practical object. That is, it should not merely gratify the reader's curiosity about the past, but modify his view of the present and his forecast of the future. Now if this maxim be sound, the history of England ought to end with something that might be called a moral. Some large conclusion ought to arrive out of it; it ought to exhibit the general tendency of English affairs in such a way as to set us thinking about the future and divining the destiny which is reserved for us. The more so, because the part played by our country in the world certainly does not grow less prominent as history advances. . . . The prodigious greatness to which it (England) has attained, makes the question of its future infinitely important, and, at the same time, most anxious, because it is evident that the great colonial extension of our state exposes it to new dangers, from which in its ancient insular insignificance it was free. The interest of English history ought, therefore, to deepen steadily to its close, and, since the future grows out of the past, the history of the past of England ought to give rise to a prophecy concerning her future.'

Our author then proceeds to search for the general tendency of events in the modern history of England. Examining in turn the claims of civilisation, liberty, and democracy to be the special mark of this tendency, he sets them aside as not sufficiently definite and distinctive; and concludes that the most conspicuous and striking change which has been proceeding for two or three centuries is—

'the extension of the English name into other countries of the globe—the foundation of Greater Britain.'

He finds that we have had at two different times two great empires, consisting mainly of lands beyond the sea. One of these was gained in the 17th and 18th centuries and in great part lost by the secession of the American colonies in the second half of the 18th century. Our second empire consists of the later discovered colonies of Australasia, the Dominion of Canada, and portions of Africa, besides the great dependency of India. Then arises the question, is this second empire to go the way of the first?

The position and the question based on it having been thus stated, there next comes a warning against prejudging the matter. Nothing must be taken for granted without warrant, not even the desirability of our great empire being maintained. It is then proposed—

'to examine historically the tendency to expansion which England has so long displayed. We shall learn to think of it more seriously if we discover it to be profound, persistent, necessary to the national life, and more hopefully if we can satisfy ourselves that the secession of our first colonies was not a mere normal result of expansion, like the bursting of a bubble, but the result of temporary conditions, removable and which have been removed.'

England in the Eighteenth Century.

In the course of this historical examination, it is remarkable how many common opinions Professor Seeley brings under investigation. Turgot's saying that 'Colonies are like fruits which only cling till they ripen,' is shown to lack some of the elements to make it a trustworthy dictum. The want of unity which seems to characterise the events of the eighteenth century is dissipated when it is shown that the seven wars which occurred between 1688 and 1815 were all episodes in the rivalry between England and France for the possession of the New World, and—

'the triple war which fills the middle of the century, the decisive campaign in that great world-struggle.'

The difference between the ancient and modern systems of colonisation is carefully indicated, and the reader is warned both against confusing them, and against regarding one as more natural than the other. They were the outcome of different conditions giving rise to different purposes. It is further shown that

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the old idea of colonies as the property of the mother state, held for the benefit of the latter, is superseded by a more enlightened idea that they are really parts of the same state with the same citizen privileges.

England's Maritime Pre-eminence.

The lecture on the Effect of the New World on the Old is extremely suggestive. The kindling of the Great Wars of the eighteenth century was one result of the discovery of the New World. A further result is thus stated:—

'The expansion of England involves its transformation. England is now pre-eminently a maritime, colonising, and industrial country. It seems to be the prevalent opinion that England was always so, and from the nature of her people can never be otherwise. . . . This unhistorical way of thinking, this disposition to ascribe an inherent necessity to whatever we are accustomed to, betrays itself in much that is said about the genius of the Anglo-Saxon race. That we might have been other than we are, nay, that we once were other, is to us so inconceivable that we try to explain *why* we were always the same, before ascertaining by any inquiry whether the fact is so. It seems to us clear that we are the great wandering, working, colonising race, descended from sea-rovers and Vikings. The sea, we think, is ours by nature's decree, and on this highway we travel to subdue the earth and to people it. And yet, in fact, it was only in the Elizabethan age that England began to discover her vocation to trade and the dominion of the sea. . . . Now this was the time when the New World began to exert its influence, and thus the most obvious facts suggest that England owes its modern character and its peculiar greatness from the outset to the New World. It is not the blood of the Vikings that makes us rulers of the sea, nor the industrial genius of the Anglo-Saxon that makes us great in manufactures and commerce, but a much more special circumstance, which did not arise till for many centuries we had been agricultural or pastoral, warlike, and indifferent to the sea."

Commerce and War.

In another lecture the Professor exposes the fallacy of the common opinion that commerce and peace are necessarily connected. A few striking sentences may be quoted from his argument on this matter.

'A common-place is current about the natural connection between commerce and peace, and hence it has been inferred that the wars of modern England are attributable to the influence of a feudal aristocracy. Aristocracies, it is said, naturally love war, being in their own origin military; whereas the trader just as naturally desires peace, that he may practise his trade without interruption. A good specimen of the *à priori* method of reasoning in politics! Why, how came we to conquer India? Was it not a direct consequence of trading with India? . . . These, the 17th and 18th, are precisely the centuries in which England grew more and more a commercial country. England indeed grew ever more warlike at that time as she grew more commercial. . . . Commerce in itself may favour peace, but when commerce is artificially shut out by a decree of government from some promising territory, then commerce just as naturally favours war. . . . The five nations of the west were launched into an eager competition for territory—that is, they were put into a relation to each other in which the pursuit of wealth naturally led to quarrels, a relation in which commerce and war were inseparably entangled together, so that commerce led to war, and war fostered commerce.'

The American Revolution.

The lecture on 'Schism in Greater Britain' opens with an interesting argument on the question, what is the true test of the historical importance of events? And the answer is their *pregnancy*, that is, the greatness of the consequences likely to follow from them. It is in accordance with this conclusion that the expansion of England in the eighteenth century is held to dwarf all domestic questions and movements, and the American Revolution is considered greater historically than most earlier events in our history in the same degree as Greater Britain is greater than England.

The question of the continuance of our great empire is considered in connection with the Schism, and the lecturer in a very noteworthy manner contrasts his own conclusions with those commonly drawn from that event.

'From that Revolution we infer that all distant colonies, sooner or later, secede from the mother-country. We ought to infer only that they secede when they are held under the old colonial system.

'We infer that population overflowing from a country into countries on the other side of an ocean must needs break the tie that binds them to their original home, acquire new interests, and make the nucleus of a new state. We ought to infer only that refugees, driven across the ocean by religious exclusiveness and carrying with them strong religious ideas of a peculiar type, may make the nucleus of a new state.

'Lastly, we infer from the greatness of the United States, since their secession, that the division of states, when they become overlarge, is expedient. But the greatness of the United States is the best proof that a state may become immensely large and yet prosper. The Union is the great example of a system under which an indefinite number of provinces is firmly held together without any of the inconveniences which have been felt in our empire. It is therefore the visible proof that these inconveniences are not inseparable from a large empire, but only from the old colonial system.'

Our Indian Empire.

The second course of lectures which occupies the latter half of this volume deals at length with the relations of England to our great Indian Empire. How this was conquered and how it is governed, in what ways the ruling country and the ruled influence each other, what dangers beset the empire within and without—all these are discussed with thoroughness, with well-balanced judgment, with impartiality.

The unprecedented character of the relations between the British Government and the subject races of India is especially pointed out and carefully described, and many popular mistaken notions on the matter are fully examined and convincingly corrected.

The limits of our space will not permit us to follow the Professor over this wide field of investigation, which, in spite of his strenuous protest that it is no part of the historian's duty to secure that his narrative shall be entertaining, we have nevertheless found deeply interesting. We heartily commend the whole work to our readers, merely reminding them that it is no mere piece of light reading, but that it sets forth a great historical subject as a matter worthy of earnest thought—of grave, serious study. Of one thing we may feel assured: to any teacher who reads these lectures thoughtfully, the weighty arguments they contain, and the impressive manner in which these are stated, must prove stimulating and suggestive. In other words, the matured thoughts of so masterly a mind as Sir John R. Seeley's, falling upon suitable soil, can hardly fail to germinate and bring forth fruit such as he most ardently desired.

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Since it is intended in this projected monthly article to name and, as far as possible, to comment on every recent publication received since the previous writing, the ordinary list of 'Publications Received' will be discontinued. It should be further understood that early notice of a book in this general article will not preclude us from giving a special and fuller notice of it later, if the nature and characteristics of the book should afford reason for considering further examination desirable and likely to serve the interests of our readers.

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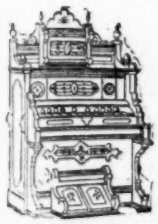

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